The Builder.

Vol. XL. No. 1964. Saturday, February 12, 1881.

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Decoration and Furniture of Town Houses.

THE "Cantor Lectures" on this subject, which were given at the Rooms of the Society of Arts some little time since by Mr. R. W. Edis, were pretty fully reported in our columns when they were delivered. They now appear in a volume,* fully and carefully illustrated, and somewhat enlarged in form. The book thus presented may be said to be the most important contribution to the practical consideration of house decoration since Mr. Eastlake's "Hints on Household Taste," and to some extent indicates the progress which has been made since then. Mr. Eastlake's book appeared when the present revival of taste in household furnishing was but young, and his "hints" were mostly of a comparatively simple and general character, well adapted to set people thinking on the subject who had never thought at all. The point then was to induce many people to recognise the fact that there was such a thing as good and bad taste in house furniture at all, and to set them going a little in the right direction. Now matters have so far advanced, in one sense of the word at least, that the object is not so much to induce people to wish for tasteful and artistic furniture, as to guide and moderate their very multifarious wishes, and draw some line between what is good and bad, genuine and false, in aspirations of this kind. So far from being indifferent on the subject of household taste, every one now assumes taste as a matter of course; either taste of his own or (more often) taste bought and paid for at an artistic upholsterer's: but whether original or purchased, taste there must be, at all events; fashion has decreed it, even though it may consist in nothing more than furnishing a house,—

"With everything that isn't old—from Gillow's,"—

as the heroine of "H.M.S. *Pinafore*" sings. The consciousness of this present over-luxuriance of "taste" is apparent throughout Mr. Edis's lectures. He evidently thinks, and very rightly, that the public need to be cautioned against an indiscriminate scramble after taste, carried out along certain paths marked by recently-adopted fashion, and to be taught to think and choose more discreetly amid the multiplicity of objects and the various modes of decoration put before them at present, and in this respect his volume comes very opportunely, although his own illustrations and recommendations are not entirely free from the influence of prevalent fashion, and perhaps could hardly be expected to be so.

In the main, however, the tone and teaching of the book is in opposition to a good deal of the high-art upholstering which is so much run after at present. The author wishes, as he says at the outset, to impress upon his readers the desirability of having everything about their houses beautiful in itself, and fitting for its special purpose, and that "the present craving after artistic work in decoration and furniture should not degenerate into any set fashion of form or colouring, which, under the clap-trap denomination of high art, is utterly false and unreal." He assumes that his readers do not want to make show places of their houses, in which the fashion of an hour shall be exemplified, either "in the various monotonous dreariness of sage-greens and peacock-blues in papering, or in quaint eccentricities of design and form in furniture, which, after a few years, will be looked upon as crude and tasteless." He justly animadverts, further on, on the mistake that is made by some professional decorators in fixing all design and furnishing in a room to one set rule, so that you feel on entering it that everything is stiff and formal, and intended for show rather than for use. "If such a room," he observes, "could speak, it would cry aloud, 'Look at me; am I not an art-room? But please do not bring any pretty things, any books or china here, or you will disturb my propriety. I am not intended to be home-like, but artistic.'" He records the fact of one such professional decorator informing a lady of excellent taste, who had brought into her room various bits of eclectic but useful furniture, that if he had known she was going to interfere in this way with his scheme of decoration, he would have declined to have anything to do with the work; a style of remark which Mr. Edis stigmatises as impertinent, and we are entirely with him. We have heard of the same sort of autocracy being assumed on other occasions, of people being told that they are not to have what they like, but what their decorator likes. It is a very natural result of the manner in which many people give themselves up entirely to the will of a decorator or of a decorating firm; but we venture to say that any man of independent taste and culture would refuse roundly to put his personal taste thus under the control of a purveyor of taste.

In the introductory chapter on the general principles of house decoration, the author enunciates views which are exceedingly sensible and sound. He is opposed completely to the mere imitation of former styles of ornament, and to unnecessary or unsuitable elaboration which is out of harmony with the uses of the apartment. He fortifies himself by the high authority of Viollet-le-Duc in urging that true taste is much more shown in having things really well made and suitable for their purpose, than in the "cheap splendours" of imitative decoration. The description of the horrors of a house furnished after the fashion of twenty years ago seems almost a necessary item in lectures on this subject, at least it is always forthcoming, and Mr. Edis's chapter forms no exception; but in general he is much more sparing of this ready way of causing amusement than many prophets of taste in furniture have been. It is very easy to denounce what every one is now agreed was bad and vulgar; but denunciations which no one is disposed to disagree with are not a profitable employment of time or paper; what is of real use is to be shown what we should do now, rather than to be told what our fathers and mothers ought not to have done.

We make the remark, however, rather in regard to the general tendencies of writers on furniture than with special reference to Mr. Edis, who is for the most part decidedly practical and positive in his teaching. "Floors, walls, and ceilings" are treated of in the chapter following the introductory one. Part of this is devoted to the possible treatment of an old house in order to provide for as much decorative effect as can be imported into it: cutting away the "generally bad" plaster enrichments so as to leave room for new treatment, or, as a less expensive alternative, applying stencil decoration; incising the stone paving of the hall so as to insert a simple border in cement, giving a little colour to it. In speaking of the pavings for halls, the author somewhat too decisively condemns "all-over" patterns in favour of mere repetition patterns. We quite agree with him that a plain red tile pavement, with an appropriate border, is very preferable to a badly-designed large pattern, and that most of the large patterns kept in tile-makers' pattern-books are bad; but it does not follow that a good one cannot be designed. Critics on this kind of subject are a little too ready, on thinking of the bad and pretentious designs of an elaborate character that are often made, to take up the cry of "simplicity" as the true taste, forgetting that, though simplicity is always better than bad elaboration, it by no means follows that it is better than good elaboration. Take the case here mentioned, of a small entrance-hall of definite geometrical shape: we should consider that the best effect would be produced by a design as elaborate as you please, so long as it is good, obviously made to fit and to suit the situation and the space; only let it be remembered that such a design cannot be got cheap, and is not to be found in tile pattern-books. In speaking of walls, some consideration is given to the exterior, although that does not necessarily come, perhaps, under the subject treated, but rather under that of architecture. Mr. Edis suggests a few plaques of bright-coloured marble introduced in panels in the exterior of London houses, by way of adding a little colour. This would be apt to look rather unmeaning, however, unless part of a more general scheme of decoration.

* Decoration and Furniture of Town Houses: a Series of Cantor Lectures delivered before the Society of Arts, 1880, amplified and enlarged. By Robert W. Edis, F.S.A., F.R.I.B.A. With 29 full-page illustrations and numerous sketches. London: C. Kegan Paul & Co. 1881.

That some more artistic efforts might be made in the way of painting cement houses, now that the idea of colouring them seems to be a good deal accepted, we quite think. Mr. Edis complains of a want of that brotherhood between architect and painter now which once made men think nothing too insignificant to work upon, even the painting of arabesques on a wall, or the tinting of outside plaster. This, we imagine, is a little exaggerated. It is on record that the first thing Titian painted (on commission) was a house-front; but we do not hear that he continued to do so after his fame as a painter of pictures was established, nor can we particularly wish to see R.A.s engaged in painting the outsides of our houses,—not, at least, with mere decorative colouring: they are better employed over their pictures. Coloured ware and faïence might, no doubt, be much employed in external decoration with very good and lasting effect.

In regard to internal decoration, Mr. Edis makes sensible remarks on the ordinary means of decoration by plaster modelling on the ceiling and by wall papers. He also desires something higher than can be obtained by such means, something in the way of painted subjects, treated in a decorative manner. He is sarcastic on classical groups and subjects, such as the "Judgment of Paris," and we suppose the "Three Graces," who have played so large a part in decorative painting, would come in for a share of the same rebuke. He asks, why should we not set forth on our walls some of the scenes from Chaucer, Spenser, Shakspeare, Tennyson, or other poets; which has occasionally been done, we may observe, in modern decoration. "Why should not our rooms contain life-stories of noble deeds, of good works, of home scenes, such as would appeal to the better life that is within us, and remind us of some good work, some noble truth?" We believe the reason why not, with the majority of cultivated people, is, in the first place, that the appeal to "the better life that is within us," morally speaking, is much more made by books now than by pictures, and that it is natural it should be so. It is an odd peculiarity among many of the present advocates of improved decoration that they have in many cases set themselves against pictures as things of inferior consequence in a room; and we regret to see Mr. Edis repeating what practically amounts to the same mistake. He says, at the close of the chapter we are now speaking of, that it is desirable, "from mere motives of economy, to decorate your rooms a little more artistically; if the walls be of the usual bare type of one-pattern paper or paint, you must do something to hide their bald and cold appearance by hanging on them engravings, pictures, or other artistic objects. How much better, then, would it be to spend the same money in having some really good art decoration, which would be a source of continued pleasure and delight." This is the most perverse placing of the cart before the horse. We have no hesitation in saying that to any cultivated mind, not carried captive by theories about decoration, there would be far more attraction in a room hung with some first-class engravings and water-colours, even on an uninteresting wall-paper, than in one decorated with the best of wall-papers and dados, but destitute of any picture worth looking at. To say the contrary is to put a lower form of art above a higher and more intellectual one.

In speaking of furniture, the author gives a bit of practical advice against putting such things as cupboards, &c., in such a manner that they become "fixtures," and pass into the property of the landlord. In regard to general taste in furniture, his leanings are evidently in favour of the revival of the style with which the names of Chippendale and Sheraton are mostly associated, though he enters a *caveat* against the imitation of this class of furniture in a merely thoughtless and fashionable spirit. "In furniture for everyday houses we want, first of all, that everything should be fitted for its purpose, should not be extravagant in design,—shall be absolutely useful, and, if it be a chair or a couch, absolutely comfortable." This is "absolutely" true in theory, but we do not know whether we should say that it is carried out in practice in the adoption of the square, straight-lined, rush-bottomed chairs which are to be found in so many houses, and appear in many of Mr. Edis's illustrations. The human body, especially when in repose, falls naturally into and adapts itself to curved lines, rather than straight ones. The light square-made chairs we speak of have the merit of honest construction in accordance with the material in which they are made, but their style is rather that of the cottage, where the expense of refinements of form cannot be permitted, than of the drawing-room. The taste for these chairs is really a re-action, and not an unnatural one, against the vulgar and showy taste of which buhl furniture is the most pronounced type; but, like most reactions, it goes too far. An ideal chair or sofa is one in which genuine and solid construction is made at the same time to follow the natural lines of the figure, not one which, under pretext of being unpretending, presents angles to the body at every point; and to say that the rush-bottomed chair is as comfortable as the stuffed one, is to say what everybody's practical experience contradicts, if people would tell the truth. The chair seen on plate 7, the main object in which is "a drawing-room cabinet sideboard," is simply what would once have been called a "kitchen chair," or what we might better call a "cottage chair." The pretence of regarding such furniture as a suitable form for an artistically-furnished drawing-room is a mere piece of affectation. We might nearly as well have sanded floors, as more "truthful" than carpets and rugs. A very practical hint is given in regard to cupboards in rooms; that the top space, if the cupboard does not rise the whole height of the rooms, should be filled up to the ceiling with another smaller cupboard, utilising the space for putting away things that are not often wanted, and avoiding the flat top which collects dust, and becomes a "trap for dirt and disease." This flat cupboard top is rarely examined, and if it were, many owners would be astonished at the amount of dirt and dust they are collecting, which is out of mind because it is out of sight. But the fact is (and we wonder Mr. Edis does not suggest it) that many such pieces of furniture are made with flat dust-collecting tops, when there is no necessity for such a mode of construction, and when a sloping top, which can both be seen and be easily swept, would look better, and be just as fitting for the practical purpose. The average London house chimney-piece the tenant is recommended to take down and put away in the cellar, whence it can emerge, if required, at the conclusion of the tenancy, the tenant's new and more tasteful chimney-piece being fixed so as to be easy of removal, and not become a "fixture." The author's ideal seems to be a very simple marble or stone margin round the fireplace opening, with wooden shelves and panelling fitted up round it: at least, this is what is shown in the "Dining-room Chimney-piece," plate 9. In this particular design there are two glaring defects of taste: the one is in the weakening of the chimney-piece lintel by cutting a niche in the middle of it to give it the appearance of a flat ogee arch; the other in the exceedingly bad and unmeaning form of the centre finish at the top, formed by the broken pediment rolled round into a couple of scrolls connected by a festoon binding them together, and with a bust between the scrolls. Both these features are bad in design, and are not even congruous with each other, the one being derived from Wren architecture, the other from Tudor architecture. So much for preaching and practice. The study mantel-piece (plate 10) has not such defects of taste, but the meagre brackets at either end are very weak when regarded as an apparent support to the large lockers over them. In fact, it seems that in this, as in so many other books on taste, it would be easy to pick out some things in false taste in the designs that are adduced to illustrate true taste. It is a pity the author allows himself to repeat the foolish and unmeaning expression, "art tiles," which has become a second shibboleth with decorators. Every tile other than a perfectly plain one is an art tile, or ought to be; if it is not, it is nothing. With the onslaught made upon the ordinary polished and twirly-whirly fender we are quite in sympathy, and the examples shown as a healthy contrast to it are really good. But pray why should fire-irons be "made as plain as possible?" So long as unsuitable decoration is not applied to the working parts of them, why are they not fitting objects for ornamental treatment? This seems to be another of the small shibboleths of modern decoration and furnishing which the true disciple is expected rigidly to carry out. Not long since we noticed in a room decorated in the most sumptuous manner in the new taste, a pair of rough iron tongs on the hearth, which seemed to have come from a blacksmith's forge, and not unnaturally concluded that the proper articles had been lost or stolen that morning; but Mr. Edis's criticism no doubt gives the true explanation. Our taste was evidently not refined up to the right point.

The chapter on "the entrance-hall, staircase, dining-room, and library" contains some practical information for general readers in regard to paint and wall-papers. In regard to ceilings, it is suggested that at a little cost, "plain deal or canvas plaster ribs might be laid over the existing plaster work, and the panels thus formed could be laid over with good flock paper to relieve the general flatness of the surface." The effect would be good, but we do not like the way of arriving at it. Panelling should be the natural result of the method of construction, not a superadded skin, which is a rather sham way of making ornamental treatment. The next suggestion, "or the whole surface may be covered with canvas plaster in a delicate all-over pattern of naturalistic or conventional leaf ornament, cast in low relief," is much better. The plaster surface is a surface, and should be treated so, unless we prefer to remove it altogether and show the joists. The idea of treating ordinary ceilings with a small all-over diaper ornament, affording a natural basis for a little colour, was suggested in the *Builder*, we may observe, years ago.*

The view given of the interior of a good-sized entrance-hall in "Modern Jacobean" is elegant, and at the same time homelike, which is one of the merits of this manner of architectural design when at its best, though it is full of details that are logically bad and would be thought ugly were we not used to them. It is a curious example of the *mélange* we have got into in regard to decoration, that on the opposite and preceding pages to this plate are suggestions for door-panel decoration in the Japanese style, which seems in vogue for this purpose even when it is introduced in no other part of a house. The specimens given are very pretty and piquant, but they have no reference to the space for which they are designed, as we hold that all ornament should have; and why, it may be asked, in the same house are forms of ornament so diverse and incongruous as Jacobean and Japanese to be introduced? And why is a door-panel the proper place to be Japanese, rather than any other? Surely these are questions to be asked. In fact, this covering of door-panels with Japanese sprays and birds is nothing but a mere fashion, having no relation to any principle or scheme of decoration, unless the whole house were "Japanesed" throughout. The public follow these fashions without a reason, and when an architect of experience and ability lectures to them, we look to have the matter subjected to the test of reason and principle. But instead of that, we have a view of a dining-room interior (plate 16), which is mostly very pleasing, especially good in the furniture and fireplace treatment, but in which the door-panels appear to have been brought from another part of the world and fitted in. If they really were so, it would be another thing; but as they are only imitation work, it is a mere incongruity.

That carpets covering the whole floor, and secured, fastened, and fitted down into all the recesses, are objectionable, is now pretty generally admitted. But though quite agreeing with Mr. Edis on this point, we protest against the inconvenient fashion that obtains in some houses of placing loose rugs about the floor here and there, with no even temporary securing to the floor. The result is that people can hardly walk about a room freely without danger of tripping up, and they are just as objectionable as the loose table-mats and anti-macassars in drawing-rooms, of which the author speaks further on with reprobation. In speaking of drawing-room decoration the author again takes occasion to repudiate the idea of making the room a kind of museum of art-furniture, designed in one special set manner, and bearing the stamp, so to speak, of this or that decorating firm. We do not understand, however, his observation about the unfortunate demand for novelty, and the desire to have things unlike those of one's neighbours. It appears to us that the contrary is more generally the case, and that we are tired of finding, in house after house, the repetition of the same effects, adopted because they are considered "high art" effects. The author recommends no dado in a drawing-room, and the absence of this feature is one means, no doubt, of distinguishing the apartment in effect

* "The Use of Plaster in Decoration": *Builder* for June 26, 1869.

from other rooms, though we do not consider the absence of the dado as at all a matter of course. But he recommends a deep frieze, painted with this or that, birds or figures, according to fancy. The "corner of a drawing-room," given as a frontispiece, in which this is done, has not a good effect as engraved, for the frieze painting comes far too near to being a picture, and carries the eye beyond the wall and out of the room. The view of an octagon boudoir, by Messrs. Gillow (plate 18) shows a very elegant and consistent room, the only fault being the absurd horizontal festoons on the ceiling, which are, of course, adopted without discrimination as being a feature of "the Adams style." The specimen of bed-room furnishing is one of the best, and is very neat and suitable. All the illustrations of furniture bear out the spirit of the remark made at the close of the fifth lecture, that "in decoration and furniture it is, above all, desirable to avoid all eccentricity and seeming quaintness in design, with no particular use or object; to take care that everything in furniture shall be strong, serviceable, and fitting for its peculiar use." This does not seem to be forgotten in any of the illustrations; we are more disposed to find some lack of elegance and fancy where we might naturally have looked for it, as in drawing-room furniture, and too much mixing up of the bedroom or kitchen style with the drawing-room style.

With all the concluding lecture, dealing with various articles of household use, we almost entirely agree. The horrible but apparently almost (in this country) ineradicable bad taste of making small objects in imitation of some larger object intended for a totally different purpose, or of something in nature bearing no relation whatever to the purpose of the object designed, is strongly condemned here, and cannot be condemned too often, though it seems almost hopeless to fight against it. "I saw lately," says Mr. Edis, "in the shop-window of one of the principal silversmiths in a Northern town, a thermometer made after the design of the Nelson monument, and a trinket-box with the outline of the Burns memorial on a small scale, with toast-racks in imitation of spreading vine branches, brooches of grouse feet mounted in gold, and various other examples of the utterly depraved taste of modern design"; and with such monstrosities we are all unhappily too familiar. We have, however, got so far as this, perhaps, that such things are now at once felt to be vulgar by all who make any pretence to artistic taste or culture; but the residuum of those who really have not even the pretence of taste,—the mass of people who "know what they like, you know" (which is generally just what they do not know), is still enormous. Some good examples of various artistically designed objects, such as articles in glass and earthenware, are given in the illustrations, and the author does not forget to point out how much really good art in things of this kind may be achieved with comparatively small money expenditure, by the exercise of taste and thought, and that "good things may be cheap things." This is an important point in relation to the idea that the aim of all true art should be "to produce good work for the million, and thus gradually to oust out all that is bad and ugly, by bringing into common everyday use things beautiful and artistic in colouring and design." A good deal more might be done in this way if a large proportion of manufacturers and dealers would themselves establish (as some have done) a high standard of taste in their productions, and not be so ready to meet the public demand for vulgar design. They would be no losers in the end, for a great deal of bad design is bought chiefly because it is made,—because people with vulgar taste have every encouragement to indulge it. If better things were habitually made, and the bad art were not easy to come at, people would buy the good just as readily because it was there, and would grow to like it because it was put before them. But it would be Utopian to expect that the demand of the moment should not be answered by the supply, in the great majority of cases. We would just observe, however, that this idea of art for the million must not be pushed too far. Other qualities being equal, the most beautiful art will always be the most costly and elaborate, and there will be and should be a demand for such rich and beautiful work as is beyond the means of the many. The point is to get people to understand that the essential qualities of good art may also be exemplified in cheaper materials and in less elaborate workmanship. In regard to the author's remark that there was in the workmen of past days an innate feeling for beauty which does not exist now, there is a word to be said *per contra*. There is in modern work, especially in objects for practical use, a great deal of the beauty of fitness and finish, where the beauty of elaborate decoration would have been sought for in ancient manufactures of the same class of objects. The clumsy old pistols and firelocks of the earlier period of fire-arms were often beautifully and richly decorated; but we contend that the high mechanical finish and perfection in the fitness of parts for their work, in a modern rifle or Colt's revolver, has a distinct beauty of its own, and one not to be despised. In fact, it is difficult to make any object in the best practical manner, and in the fittest shape for its purpose, without making it more or less pleasing to the eye and taste. The greatest amount of bad taste arises from arbitrarily making things in a manner unsuitable to and not suggested by their purpose.

Mr. Edis's book is pretty sure to be widely read, and is especially valuable for the very practical tone which mostly pervades it. It falls short of being an ideal treatise on the subject, just in so far as its author has been unable to separate himself entirely from the influence of prevalent fashions in decoration, and to treat the subject from the standpoint of first principles; but it may be admitted that it is very difficult for an architect engaged in practically superintending house decoration, and coming constantly into contact with the methods approved by the artistic fashions of the day, to separate himself entirely from them.

THE STATE OF ARCHITECTURE IN ITALY.

IT seems a moot point whether the true office of the critic be one of indulgent praise or of severe justice, whether the merits are rather to be drawn attention to, shortcomings leniently treated, and encouragement afforded, or that faults solely are to be mercilessly held up to blame, and dangers prophesied. That the question is ever likely to be satisfactorily settled is improbable, for there will always remain partisans of both theories. On the Continent it is rare indeed to read, apart from the attacks dictated by personal feeling, anything but the most mellifluous laudation of the productions of every personage who is more or less "in view"; so general is this habit, that the stranger would be very unwise who would expect to arrive at any impartial view from what he might imagine to be native sources. An artfully-arranged process of what may be termed "mutual admiration,"—though, let us hasten to say, without any of the offensive features usually connected with that system,—excludes almost universally any written expression of discontent, of blame, or of "criticism," in fact, as we understand the word. It is therefore positively refreshing to find, from a foreign source, a genuinely severe and critical view taken of a subject usually treated only with self-satisfied contentment. When such a view coincides with the impressions of the impartial looker-on, it is a fact worth noting, and the view merits attention.

The Principe Baldassare Odescalchi, who published not long since an admirable work on the artistic and industrial movement in England, in France, and in Belgium, the result of a recent visit to those countries, has written, a few days past, and addressed to the Mayor of Rome a lengthy and serious letter on the state of the contemporary architecture of Italy. To those who follow the movement of the profession abroad it may not be uninteresting to see the opinions of an Italian on the architecture of his own country, and if we are to judge by the severity of the tone of the critic (apart from the position occupied by him), he can scarcely be accused of being insincere or partial.*

It is somewhat a severe sentence passed on the "Classicism" of the beginning of this century, in spite of the sad disdain that has been heaped on its productions, to say that the imitations were made "without much taste, without any grace, with no originality, and no invention"; but such, we are afraid, is the fate of all fashions out of vogue. It is somewhat more to the point, though the view cannot be said to be original, that in the rage for "romanticism" which influenced so deeply the art and literature of half a century ago, and which, in architecture, was marked by a revival of our admiration for the so (improperly) called "Gothic," that the productions, or even inspirations, of such a distant period were ill adapted to the needs and habits of our century. Such an argument must, we are afraid, always appear valid in spite of all the arguments that might be brought against it, when instances so unanswerable are adduced as the modern necessity for railway stations and universal exhibitions. Though it is undeniable that the spirit is far different in the present day from that in which were erected the great cathedrals of Gothic times, the huge abbeys, the silent cloisters, the towering castles, the homes of nobles whose feudal power was almost unlimited, it is gratifying to find that the critic who can understand and urge this can yet admit that there have been built in this so-called Gothic style more than one excellent work, among which he ranks foremost Barry's Houses of Parliament and Ferstel's Votive Church at Vienna.

Of the modern phase of "realism" which has influenced so powerfully the sister arts of painting and sculpture, and in which our Italian critic foresees the germ of a new revival, no trace can be noticed in modern architecture, though a reference, we think, was due to the realistic cast-iron architecture which, within some years, has been making strides. From the study of nature, Prince Odescalchi traces the indubitable improvement in the modern school of sculpture and painting. But the study of nature can scarcely be said to help the architect; columns do not grow from the ground like trees, and though the acanthus-leaf may have suggested, according to a charming legend, the Corinthian capital, it required none the less an effort of artistic design to adapt this natural ornament to its position. Of the architecture, therefore, of the present day it cannot be said that, like its sister arts, it is "realistic."

It is generally recognised, remarks the critic, that our epoch is, from an artistic point of view, sadly wanting in inventive faculty: that it bears no marked character such as is the case with the periods of the Middle Ages or the Renaissance. Our architects have not been willing actually to copy; nature has not produced any new types or new examples. What has happened? Our architects have simply ceased to become designers, without, however, ceasing to build. Every style and order has in different hands been wildly made use of, and the result produced, it must be admitted, has been of the most unsuccessful nature. This is the state of decline and abjectness into which our architecture has fallen in the present day, and from which it is absolutely necessary that it should, if possible, be dragged.

In Italy there have recently been built a number of important edifices; perhaps the most noteworthy of these is the Ministry of Finances at Rome. It is sad, however, to have to admit that this building is alone chiefly remarkable from its imposing size; the details are of the most debased taste, and used without any apparent knowledge, still less elegance. The honourable minister (Sig. Sella), who is reproached with the direction of this unfortunate edifice, will scarcely read Prince Odescalchi's condemnation of his want of taste in favouring such a design without some emotion. The position of the minister in this unfortunate matter permits Prince Odescalchi an apt digression on the importance of the part played by those who have it in their power to call in the aid of the artist, with whom the fault, it must be owned, cannot in every case be said entirely to lie. I am persuaded, says the writer, that those who, after the friend of Augustus, are called Mæcenases, have a great influence on the artistic productions of their time. It is of the utmost importance that they should employ the best artist among those about them, and in his works aid him with counsel and advice. It was in this spirit that King Louis of Bavaria acted, and he undoubtedly advanced art as far as it was possible in his day, and with the artists who were then living. If we look further back we find numerous other examples. Certainly it cannot be denied that we should never have had the *stanze* of Raffaelle if that painter had not met with an appreciator in Julius II., and so completely is this the case that history never fails to couple the names of Julius II. and Leo X. with those of Raffaelle, Michelangelo, Bramante, and many other artists. It is the union, in fact, of these names which formed a complete period, a complete culture, a complete

* The letter to which we refer appeared in the *Opinione* of January 21st, 1881.

art, a complete civilisation, and which is known to the world as the Italian Renaissance.

After this digression, the writer continues his review of the architectural movement in Italy. In Rome has been recently built the "Palazzo della Posta." This, it is true, was not wholly built afresh, but was an old convent modernised. The work is, however, none the less in the worst taste. It chiefly consists of Venetian reminiscences and adaptations of the exquisite details that are reflected in the waters of the lagoons from many a palace in the Canal Grande; but while in the original reign the utmost sobriety, harmony, and poetry, almost impossible to attain in the present day, here we find only caricature and confusion, and hence, though composed of the finest elements, the whole building is unsatisfactory to a degree.

The modern works executed in Milan only show another phase of the decline. In the huge "Galleria Vittore Emanuele," as also in the new "Piazza del Duomo," the only features which strike the eye are the wealth of marble and the heavy ornaments, but throughout the whole is evident a want of the simplicity and elegance of the great days of Italian art. It is not "architecture in delirium" (an expression which it appears the critic once applied to the architecture of the new buildings in Rome), it is simply ugly (*brutto*). To form an idea of what is really "architecture in delirium," if we are to believe Prince Odescalchi, we must go to Padua. It is from the experience of a visit in the course of last summer to that interesting town that our critic justified his severe remarks on its modern buildings.

The Municipality of Padua, rare phœnix among the municipalities of Italy, having found itself in possession of surplus funds, determined some while since to erect a number of edifices "of public utility." Among these are a palace for their civic museum, and another for the municipal schools. The architect chosen was Signor Camillo Boito. Signor Boito, as the writer remarks truly, is certainly very much better known as an eminent art-critic than as an architect.* As might be expected from a writer who had expressed his views on the necessity for a new architectural style in the present day, Signor Boito endeavoured to carry out his theories at Padua. Prince Odescalchi may be severe, but we are afraid he is only too sincere when he speaks as disrespectfully as he does of the architectural merits of Signor Boito's work. The elements of his architecture, he remarks, seem drawn for the most part from the old Lombard style, but are so extravagantly applied as to form the most indigestible miscellanea (*la più indigestible miscellanea*) it is possible to imagine. Our critic enters at this point into a number of details, on which, however, we need not dwell; suffice it to have seen his view of Signor Boito's attempt at the introduction of a new architectural style. It is an architecture, he remarks, which seems made to excite hilarity and comparison of it with the monuments of the Middle Age, and the result only the more cruelly shows us to what a position we have descended.

It is in Tuscany alone that the writer finds still in existence any of the antique traditions of that cradle of the intellectual and artistic Renaissance of Italy; there, at least, it would appear that the architects have not endeavoured to bring into favour any new style, but have contented themselves with copying the old works and adapting them to modern requirements. The enlargements of modern Florence are on the whole, in his opinion, in good taste. In Florence have been built a number of palaces in the old style, all of which show much power on the part of their architects, and in Siena more than one work in which the architect has simply contented himself with using and adapting to his needs the models of his predecessors are mentioned as worthy of praise. Why not invariably follow this example (urges our critic at this point), instead of racking our brains to invent new styles which only lead to the most unsuccessful and confused results? Why not copy? And let it not be imagined that in copying the architect is merely a mechanic; he can easily show his artistic power. It is almost impossible (as architects well know) that, in reproducing an old building, one meets with the same conditions of situation or visual perspective; there is always the necessity for a great deal of adaptation, and in this is revealed the power of the architect.

"I do not deny the possibility of the advent of a new architecture," writes our critic, "but if this phenomenon is to occur it will be aided by such a procedure," and certainly in foreseeing this "possibility," Prince Odescalchi is supported by the evidence of history.

The extraordinary period of the Renaissance, when the art, the literature, and the philosophy of the Greeks and Romans received such earnest and feverish study, shows us the most revered names in art, aspiring to revive the works of their classic predecessors in copies and adaptations as accurate as the observation and archæological knowledge of the time enabled them to produce; yet such was the artistic power shown in these adaptations that at a glance the practised eye can detect the work of the Renaissance from that of Classic days. Such a spirit Prince Odescalchi feels justified in believing might be expected from a similar procedure in the present day, but he confesses to an inability to prophesy its advent, this much, however, he confidently feels assured of, that a new style can never come from the existing "vainglorious ignorance, nor from the modern system of confusing every style and epoch," which, as he very truly states, is only calculated to precipitate even more rapidly the decline.

The study and understanding of those great monuments of the past, which have received the sanction and admiration of the learned, this is what we should never tire of urging to our artists; by such means alone can we hope that our architecture can be revived. Prince Odescalchi concludes his warm letter with a recommendation to his countrymen to emulate the example of the pupils of the French school at the Villa Medici, who each year produce learned restorations of the great monuments of the Classic, the Middle Age and the Renaissance art of Italy, and in a last sentence he expresses the fervent hope that in the exhibition to be held at Rome in the forthcoming year, Italy may show the results of her efforts in this direction.

* We had occasion some time since to review in these columns a work by Sig. Boito, on "Leonardo da Vinci and Michelangelo." See vol. xxxvii., p. 145 (Feb. 8th, 1879).

ESCAPE FROM A SECOND TAY BRIDGE CATASTROPHE.

THE banks of the Solway are the birthplace and the home of legend. The region is resonant with ballad. The magic of nature seems to have prepared a scene for the magic of romance. The craggy heights of Criffel look down on a noble estuary. The tourist who views the spot from the lofty top of Skidaw sees fertile plains divided into numerous enclosures that look like gardens, while the river, when the tide is in ebb, traces a fivefold line to the sea. On either side are brown and glittering sands. Then come two converging lines of turbid water; and in the centre is a narrow streak glittering like silver. Nor are the charms of the natural scene all that add interest to the spot. Over the broad expanse of sand the sea sometimes comes up in flood as fast as a horse can trot. And in the little fishing village of Allonby, when stormy weather is at hand, the hills of the Isle of Man may often be distinctly seen, although such vision is but the effect of mirage. High country intervenes between the shore of the Solway and the western coast of the Irish Channel, so that the appearance of this natural portent is in itself a phenomenon fitted to dispose the mind to the ready acceptation of the marvellous. Nowhere in the British islands, except from the hills to the east of Cork, have we ever witnessed the rare deception of the *fata morgana* so plainly as on the banks of the Solway.

On the last day of January in the present year, the Solway very narrowly escaped becoming the scene of a calamity that would have been without a precedent in all the ghostly tales of border-lore. It was due to the simple, old-fashioned, often derided precaution of the night-watchman that the evil fame of the Solway viaduct has not rivalled the discredit of its sister structure across the Tay,—sister, that is to say, in object and in fate, albeit presenting little family likeness in appearance; indeed, the very opposite principles have been adopted for crossing the two estuaries. In the Tay Bridge the central girders spanned openings of 245 ft. wide. In the Solway Bridge the spans are only 30 ft. Thus eight piers have to be reared, in the latter structure, for one on the former. The height and cost of the girders, which, on the Tay Bridge were 27 ft. deep, are proportionately diminished. The Solway Bridge would have felt almost nothing of the storm which blew down the Tay Bridge. But the Tay Bridge would have been but little affected (or might have been but little affected) by the islands of floating ice that crushed so many of the light and frequent piers of the Solway Viaduct.

The Solway Bridge has been open for traffic for above twelve years; it ought, therefore, to be all the more remembered, to the credit of the officials of the railway company, that on the setting in of the thaw the bridge was carefully watched. The accounts at present received do not mention when the traffic over the bridge was suspended. It is, however, evident that no trains were allowed to attempt to cross the Solway on the night of the 31st, for had such been the case, the catastrophe of the Tay Bridge would have been exactly repeated. So loud were the crashes of the ice against the piers of the bridge in the course of the night, that it was feared that serious damage had occurred. By daybreak it was seen that five of the piers, each consisting of five hollow columns, of 12 in. diameter, had been destroyed, although the continuous line of girder and platform was so well bolted together as to be unbroken. Some of the other piers had been damaged; one, indeed, had been damaged on the 29th. On the night of the 31st further damage was done to the structure by the masses of ice borne by the high tides, and on the morning of the 1st instant a complete gap was made, to the width of 90 ft. This is about 600 yards from the Scottish or northern end of the viaduct. Nearer the Cumberland coast is a yet wider breach, extending, it is said, to the width of nine of the 30 ft. spans. The bridge was veiled in a dense fog through the night, and the damage done was not fully ascertained on the morning of the 1st.

The length of the viaduct is stated at 1,960 yards, and as the waterway is also given as 5,666 ft., only the width of 12 in. is allowed for each pier. In fact, the supports of the girders appear to have been simple rows of iron columns, of 12 in. diameter, five in a row. These are described as sunk into the bed of the Firth to an average depth of 16 ft., the height being from 35 ft. to 40 ft. If this be correct, it would seem difficult to design a mode of supporting a river bridge which would form a more effectual ice-trap. A great number of feeble columns, planted at the narrow intervals of 30 ft., afford a positive invitation to danger from ice or floating wreck. The only things to cause surprise are,—How could the Board of Trade have sanctioned such a structure? and, How is it that it has stood so long?

It is curious that in the mode of crossing these two important estuaries such opposite ideas of economical structure should have been carried out. No doubt, the height of the rails above the sea had much to do with this, as the Tay Bridge, if the accounts are accurate, was three or four times as high as the Solway Bridge,—as high, that is to say, measured to the level soffit; for the depth of the 245-ft. girder was, of course, much more than that of the 30-ft. girder. But if the height were fourfold, it is hardly a justification for an eightfold difference in the span. In point of fact, spans of 30 ft. form almost the cheapest possible arrangement for a long viaduct. Where the expenses of obtaining foundations are great, this circumstance has to form the basis of a comparative calculation. In other respects, while the cost per foot super. of the platform, rails, &c., is the same for all spans, the cost of the main girders is almost directly as the squares of the spans. In the Solway Bridge the simple and inexpensive character of the piers was such as to allow of the reduction of the span to the narrow width before stated. But the economy was a pitiable one which dotted the bed of the Solway, with rows of feeble columns which any hard winter menaced with overthrow.

It is a remarkable circumstance that, in two cases presenting so close a parallel, the pursuit of economy has led to the exposing of the several structures to the destructive action of two natural forces against each of which the engineer had ample warning to provide. For what may be called a new danger in the history of bridge-building, the engineer of each viaduct indeed provided. The Roman engineers, and the French and Italian architects, who reared the great bridges, viaducts, and aqueducts which form some of the marvels of European architecture, never contemplated having to design structures that could support trains of carriages of hundreds of tons weight, whirling along at a speed of from ten to fifty miles an hour. The weight that could come on a Roman bridge was comparatively small. The effect of wind-pressure, even in such cases as the

Pont de Gard, or the lofty Alcantara aqueduct, was not formidable against the weight of the solid masonry of piers and arches. Of the three elements of overthrow against which the old bridge-builders had to provide, viz., moving weight, pressure of storm, and shocks from floods or from floating bodies borne down by floods, no doubt by far the greatest amount of attention was given to this last-named risk. In Old London Bridge, as we have mentioned in another place, there were 10 ft. of pier to 7 ft. of arch. When the engineer attempted to cross a deep estuary by gigantic strides, he forgot how great a destructible surface he exposed to the fury of the wind. On the other hand, when he attempted the same task by short and numerous steps, and thus provided in the most economical way for the support of moving weight, and produced a structure that could defy the wind, he forgot how liable were his numerous and slight supports to be swept away by ice, or by any floating matter dashed against them by tide or by current.

It is not to the credit of our practical architectural knowledge that we find, on the two opposite coasts of Britain, one bridge-builder falling into Charybdis, while the other falls into Scylla. Economy is a great point for the architect to study. But it must be a wise economy. The first oversight committed by the great bridge-builders of the railway times was that these structures were insufficient to bear the weight of their own thrust, or the weight of their own material, combined with that of a passing train. It ought to lead us to view other errors with much consideration, to reflect that two of the first engineers that our country produced had to learn the imperfections of the formulæ on which, together with their brethren, they relied, by failure. Mr. Brunel's Maidenhead Bridge fell down by its own weight when the centres were struck. Mr. Robert Stephenson's Dee Bridge broke down with the first train that came on it after it had been covered with a coating of gravel. So that when we add to these the Tay Bridge, fairly torn from its piers by a hurricane, and the Solway Bridge, with its legs knocked from under it by floating ice, we have practical warning of the force of the three chief different dangers with which, as before said, the bridge-builder has to contend. May we not hope that the fourth catastrophe may cause all concerned to put to themselves the question whether, in looking to cheapness, they have provided against every source of danger? And we must add that a special warning has been given to look to the soundness of all great viaducts, more especially those made of iron. The loss incurred by the destruction of the Solway Bridge is very heavy. Watchfulness prevented it from being fatal. We should like to be convinced that there are no other cases in which very probable causes of danger have been overlooked in construction, or in which rust, vibration, or molecular change has not been allowed to make silent inroads on the margin of stability.

ADDRESS OF THE PRESIDENT OF THE INSTITUTION OF CIVIL ENGINEERS.

IT would be doing injustice to the excellent address delivered by Mr. Abernethy, on taking the chair as President of the Institution of Civil Engineers, to attempt to condense it. Glancing very briefly at the subject of the great impulse given to ocean navigation by the introduction of the railway system, Mr. Abernethy gave a bird's eye view of the principal ports of the United Kingdom, commencing with Glasgow and Greenock, going round to Leith and Aberdeen, and adding a few words as to Dublin and Belfast. The chief European and the Indian ports are passed in brief review; and there are notes as to our steam communication with America.

From the subject of ocean navigation, and ocean harbours, the President passed to that of inland navigation, and gave a few particulars as to the canal system of Canada. He remarked that for many years the canal system of Great Britain, some 4,500 miles in extent, has received little attention. He is of opinion that with the aid of the screw-propeller much might be done for the utilisation of canals, and that this economical mode of transit might serve as a most useful adjunct to, or substitute for, our railway system, for the transport of various descriptions of heavy goods and raw materials.

We hope that during the presidency of an engineer so familiar with that most delicate of all the branches of professional study,—hydraulic engineering,—as Mr. Abernethy, the Institution will obtain full accounts of the noble works now in progress in France, at the cost of 40,000,000*l.*, for the completion of the inland navigation of that country,—works to the prosecution of which is to be attributed that high condition of industrial prosperity which has of late taken such a bound upwards in France.

Mr. Abernethy's remarks as to the projected Panama Canal will be read with respectful attention. An estimated cost of 33,726,000*l.* will, he says, cause no surprise. Considering the difference between the estimate and the cost of the Suez Canal, however, those must be very sanguine optimists who put much faith in any preliminary estimates from the same quarter. The construction of a reservoir to contain the floods which raise the Chagres river by no less than 28 ft., so as to maintain a minimum discharge of 7,000 ft. cube per second, with a dam 147 ft. 6 in. in height, and a capacity of 1,000 million cubic mètres, may be justly called a colossal work. Without expressing any very definite opinion, Mr. Abernethy seems to lean rather towards the Nicaragua route. It is to be hoped that during the present session of the Institution some good comparative account of these gigantic projects will be brought before the members.

Finally, Mr. Abernethy refers to the now urgent question of river floods. He indicates the general outline of the remedial measures necessary. "No adequate funds," he remarks, "exist for carrying out these necessary works; the small means available, even for ordinary maintenance, is badly administered by numerous managing bodies, divided in their interests, and with no common end in view. Hitherto all attempts at legislation, with a view to provide means for the execution of effectual works, have failed by the opposition to measures for the necessary taxation of the entire watershed of each river."

On this subject we call attention to a paper by Mr. Urquhart A. Forbes, in *Macmillan's Magazine* for the present month, in which the provisions of the Rivers Conservance Bill, now before the House of Lords, are compared with the "broader principle" of the Bill prepared by Mr. Magniac. We have before expressed the opinion, which is held by all hydraulic authorities, as to the necessity of unity of control for each watershed district. Mr. Forbes's suggestions as to the mode of attaining this end merit attention.

THE SANITARY WORK OF AN ARCHITECT.*

THE Architectural Association has ever been to the fore in all matters concerning professional education. Indeed, I think I may truthfully say that it has done more in this direction than any other society. Although at one time I feared that too great a love for the fine arts and the picturesque, to the exclusion of the arts of construction, was likely to lead many of the members astray, and make them architectural artists instead of artistic architects, it is pleasing to observe that, on the whole, a pretty even balance of the study of the ornamental and useful arts has been maintained, and it is not improbable that many a student has derived greater benefit from, and obtained more information at, the Class of Design and the Class of Construction and Practice, than he has in his first three years of apprenticeship or office routine. If little be learned at the time from the rapid reading of papers, they very often suggest subjects for study and reflection, and throw a halo of interest round that which was previously regarded as dry, uninteresting, or unimportant. In the short paper I read to-night I can but give you a passing view of the wide field of sanitary science,—a science which includes everything that can prevent disease and promote the public health. My remarks are not addressed to those who have made a special study of the subject, but to those who have not, my object being to call the attention of the younger members of the profession to the importance of the subject, to its bearing upon the profession, to the interest it possesses, to its many branches, and to a few general principles and practical points, so as to lead them to a more careful study of the subject than they may hitherto have thought necessary. Study it you must: profit all you can by others' experience, but experiment for yourselves; prove all things; expect some failures, and remember that there is no royal road to learning. The great thing for the profession to do is to agree upon general principles. Differences in details must always exist. General principles may be discussed here, but details are better discussed in the classes you have for that purpose.

You must all be aware that by the general public, architects are not accredited with a profound knowledge of sanitary subjects, and that at various times they have received some very hard knocks. Some of these raps have been well deserved, for there undoubtedly is in the profession a certain small section of weak-minded, undiscerning, and affected men, who rave about "high art" in inflated language, and who seem to be totally oblivious to the requirements of the infirmities of mortal man. They will spend days over the decoration of a ceiling or the contour of a moulding, but the ventilation, general sanitary appliances, and drainage of the building they leave to the plumber, to the labourer, and to chance. Artists, great artists, or designers they may be, but they have no just claim to the title of architect. Again, there are those who fail to recognise progress, and whose specifications of to-day do not differ from those they wrote, say, thirty or forty years ago. It was but a month ago, I heard a well-known member of our profession say,—"After all, the old 'pan-closet' has much to recommend it." On the other hand, there are many members of our profession who have quietly and unostentatiously laboured in the field of sanitary science, whose labours have been productive of much good to the community, although they may not always have met with the appreciation they merited. It is quite amusing to hear the mushroom self-styled "sanitarian" of the day talking of subjects that have engaged the attention of many members of the engineering and architectural professions for years past as if they were recent discoveries of his own. More than twenty years ago I was taught the principle of disconnexion of wastes from the drain, and have practised it ever since, although, of course, I have altered and improved the details from time to time. I believe the principle was advocated at that period in the *Builder*, to the editor of which paper the profession owes so much for the prominent position always given to all sanitary questions, as well as for the healthy tone always sought to be maintained in professional practice and conduct.

A few words at starting are needed as to the importance of my subject, and the beneficial effects that have been obtained by sanitary work. I feel it is necessary to say something on this head, as comparatively few people are yet aware of it, and it was only the other day that I heard a fully-qualified medical practitioner say he would as soon sleep over a cesspool as anywhere else! There can be no doubt that the constant publication of vital statistics from the Registrar-General's office, which was only commenced in 1838, has been of the greatest value to the community at large; for, not only has it drawn the attention of the Government to the prevalence of preventible diseases, which has led to the passing of important Acts relating to public health, but it has also resulted in impressing upon individuals the necessity of an acquaintance with hygiene, or the art of preserving health. From the returns of the Registrar-General we learn that in the United Kingdom one death in every five that occur is from some zymotic disease,—a disease caused by the neglect of proper sanitary precautions,—150,000 deaths annually from causes within our power to prevent. From the published records of the medical officer of the Privy Council we learn the results of sanitary works in twelve towns, and a study of the tables there will show that there has been a saving of life from 2½ to 32 per cent.,—a reduction of typhoid fever rate of from 10 to 75 per cent., and a reduction in the rate of wasting diseases of the lungs of from 11 to 49 per cent. It may be fairly assumed that for every unnecessary death we have between twenty and thirty cases of sickness. These are facts which speak for themselves, and cannot be too well known.

In planning a new building for residential purposes, the question of aspect is one of the first that the architect should consider, and I do not think a student can do better than study Professor Kerr's very carefully-written chapter (chap. ix.) in "The English Gentleman's House."

* A paper by Mr. Ernest Turner, read before the Architectural Association on the 4th inst., as elsewhere mentioned.

The following quotation from that book is particularly worthy of notice:—

"Every room, in short, has, according to its particular purpose, not merely a better aspect as opposed to a worse, but a certain very limited range of suitable aspect, as opposed to the whole remainder of the compass more or less decidedly unsuitable. Here, indeed, arises one of the greatest possible difficulties of plan, demanding on the part of the architect so much careful attention to domestic requirements, and so much patient exercise of skill in plotting, as to be in itself a science. Add to this, again, the considerations of accidental prospect, frequently altogether at variance with those of aspect; and the need for both knowledge and dexterity, if the plan is to be a completely scientific one, becomes still more clearly perceived."

In London, it will be seen by a glance at the map that, generally speaking, the principal streets run north and south, and east and west. I observe that in a recent paper, the author, speaking of choice of aspect, said that on the whole he preferred east and west. I am inclined to regard this as an individual preference only, and not in accordance with generally-accepted views of health and comfort. I have lived in London houses facing east, and also in those facing south, and have no hesitation in expressing a decided preference for the latter. If you consider for a moment the general plan of a London house, which places the dining-room in front on the ground-floor, and the drawing-room above, you will have no difficulty in understanding the preference. Look at the cold, cheerless appearance of the front facing east,—with the windows closed to exclude the wind, and the balconies either empty, or supporting a few flower-pots, dried stalks, and withered leaves,—compared with the sunny and cheerful appearance of a southern front, covered with the foliage of the hardy creeper, and having its balconies full of flowers in the summer-time and evergreens in the winter. In this country I think we should court light and sunshine, and should not forget that they are important agents in developing the human frame and maintaining health. Dr. De Chaumont says that one of the reasons why Europeans have suffered in health in tropical climates has been the practice of shutting themselves up in darkened rooms during the daytime, and that although careless exposure to the sun is bad, if proper precautions are taken, it is found that those who move freely about in the air and light are much more healthy than those who shut themselves up in the dark for fear of the sun.

Should you desire to see a striking example of error of judgment in placing and planning a building, you cannot do better than visit the Royal Victoria Hospital at Netley. Although within a few hundred feet of the present site of the building there is a fine deep bed of gravel, the building is erected upon a shallow bed of gravel overlying clay. The aspect of all the wards is north-east, totally devoid of sunlight and warmth. Another striking sanitary defect in this building is the absence of proper ventilation of the soil-pipes. It is probable that in the lectures of the eminent Professor of Hygiene, the late Dr. Parkes, and his talented successor, Professor De Chaumont, to the Army Medical School, these defects have served as good illustrations of what to avoid, and it may be that the authorities of the War Office wish to retain a few horrid examples for this purpose. Whether this is quite fair to our invalided soldiers is a question I will not venture upon.

With respect to the choice of site for a dwelling, the architect has very frequently little to do. His client has probably secured that before he is consulted, but should he have to advise, he must take care that the site shall be dry or easily capable of being made so by proper draining. Clay soils are generally damp and unwholesome, and so are alluvial soils, which, though porous, are mostly wet and malarious. The igneous and metamorphic rocks are good, as also are limestone, sandstone, and chalk (if not marly). Gravel is preferred by many to any other soil, but care should always be taken to ascertain that there is a deep bed of gravel, as there is no worse soil than a shallow bed of gravel with a subsoil of clay. In towns, care should also be taken to guard against made soils which have, perhaps, been rubbish-shoots, and contain decaying vegetable and animal refuse. The plots of "made-ground" upon which so large a proportion of houses in London, Liverpool, and other large towns are built, constitute a very serious evil. The materials out of which such a soil is made consist of house-sweepings, street-sweepings, cinders, decomposing vegetables, and any and every variety of dust and dirt, most of which contain organic matters in large and therefore dangerous proportions. If the house must be built on made ground, then an attempt should be made to secure ground that has been "made" for at least two years before being touched for building purposes.

It must be remembered that soil is an air-carrier as well as a water-carrier, so that gases of all kinds find their way through the soil. The air of houses being warmer than the external air, sewer air, coal-gas, and, indeed, any other gaseous matter, is liable to be drawn from the earth into dwellings, and take the place of pure air. A recent inquiry by one of the Inspectors of the Local Government Board showed that a very probable cause for the fever which was endemic in the place was to be found in the emanations of ground-air from a polluted soil into the interior of houses. This is quite in accord with the teaching of the late Professor Parkes, who attributed to emanations from the soil attacks of cholera, dysentery, paroxysmal fevers, and various forms of remittent fever. It is a good rule to make that the whole ground surface shall be properly asphalted or covered with a layer of good cement concrete, rammed solid, at least 6 in. thick. This is one of the recommendations made by the Local Government Board in their Model Bye-laws as to New Streets and Buildings, which you would do well to possess and to study for the many practical hints they give. Especially as to the construction and position of house-drains are these bye-laws useful; and since the Local Government Board is not likely to have laid down for general application any rules on this subject which were architecturally open to question, you may fairly regard the instructions these bye-laws give as being those upon which the profession is sufficiently unanimous.

The beneficial influence produced upon health by a dry subsoil is well established, and the level of ground-water deserves much more attention than has hitherto been given to it. When the level of the ground-water is high, the soil above is made cold and damp, and colds, rheumatism, and consumption are the diseases that result from it. Dr. Buchanan, now the chief medical officer of the Local Government Board, gives, in one of his reports to the Privy Council, very strong evidence as to the diminution of consumption after the lowering of the ground-water level. In Salisbury, for example, the reduction of the rate was 49 per cent. The drainage of the site should be effected by land drains, care being taken that the outfall is not in any way connected with the soil-drains or sewer. If properly executed, it is surprising how far the influence of these drains will extend, and I will give you an interesting example from my own experience:—A client purchased a large house in one of the London squares, and wished the sanitary condition of the premises to be made as perfect as possible. The lower portion of the walls in the basement showed unmistakable signs of damp, and I was informed that the neighbourhood had in former days been a marsh, and that now the level of the ground water was frequently only 1 ft. under the floor. I had several holes sunk in different parts of the basement, and found that the water stood at a nearly uniform level of 3 ft. 6 in. below the floor, and that, although we had some very wet weather, the water did not rise appreciably. I also noticed that the walls were drying, and was somewhat puzzled to account for it. Upon inquiry at the adjoining house, however, I found that a short time previously the owner had laid down land-drains under the whole of his house, and so efficiently had this been done that my client's house was drained (that is to say, the ground-water had been lowered as much as possible, having regard to the outfall) at his neighbour's expense. My client's house covered an area of nearly 4,000 square feet, and I have no doubt that the house on the other side of the one drained was similarly benefited.

Pettenkofer mentions a striking instance of the effect of subsoil drainage on some kind of fever in horses, and as architects frequently have to superintend very large stable buildings it is a point of much interest. In two royal stables near Munich, with the same arrangements as to stalls, food, attendance, &c., horses (of the same class) suffered very unequally from fever, and horses sent from the unhealthy to the healthy stables did not communicate the disease. The difference between the two places was that in the healthy stables the ground-water was 5 ft. to 6 ft., in the unhealthy only 2 ft. 6 in. from the surface. Draining the latter stables and reducing the ground-water to the same height made these stables as healthy as the others.

In the country, where there is no system of water supply, the architect will, of course, consider the possibility of obtaining a pure supply, and here he will do well to call to his assistance the engineer and the chemist.

Perhaps in the majority of cases in an architect's practice no necessity arises for subsoil drainage; but there are few cases where a good layer of concrete over the whole of the building area will not be advantageous in keeping the house free from any unhealthy emanation from the soil. A free circulation of air between this layer and the floor above should always be secured. Many architects do not raise the level of the floor sufficiently above the ground because they like the squat appearance of the house. Whatever æsthetic gain there may be from such a practice, it is dearly bought at the sacrifice of health. I do not suppose that in late years a dwelling built by any one with any claim to the title of architect has been devoid of a damp-proof course and air-bricks; but too frequently, and especially in the country, these are not placed high enough, and in a short time the paths or flower-beds are raised, and both air-bricks and damp-proof course fail to serve the purpose for which they were intended.

By far the greatest proportion of our English houses are, and must be, built of brick. The porous nature of brick is well known; indeed, Pettenkofer, the great German sanitarian, has shown the possibility of blowing out a candle through a 9-in. brick wall. Accepting brick, therefore, as the most customary building material, it behoves us to do all we can to modify the effects of this porosity. I believe that our brick-built houses would be much healthier, inasmuch as they would be drier and warmer, if all external walls were built hollow. Architects, indeed, generally agree on this point, though it is surprising to see how comparatively few dwellings are built in the manner recommended.

We now come to the consideration of soil-drains, and I am sorry to have to admit that there are numerous cases on record which show that architects standing well in the profession have most culpably neglected the drainage of their buildings. For an instance of this we need go no further than the New Government Offices recently erected, at a very large expense, in Whitehall. Not long since, I was called upon to investigate the cause of a pestilential odour in a London mansion, which had been built about four years from the plans and under the superintendence of a well-known member of our profession. Examination proved that, owing to the defective construction of a trap and improper pipe-laying, scarcely any of the house-drainage had ever reached the sewer. At the time of my first visit there were about 3,000 gallons of sewage under the floors of two rooms; this had to be pumped out, when, of course, the earth was so saturated that a considerable quantity had to be removed, the whole place disinfected, and a bed of concrete laid. This was certainly the worst case I ever met with; but my daily experience compels me to say that more attention to the subject is required of architects. If the drawings made in architects' offices during the last six years for the many beautiful buildings which have been erected were overhauled, I fear that the contrast would be only too apparent between the elaboration of the details of the ornamental brickwork, masons', and joiners', and decorators' work, and the meagreness of the few red or blue lines usually found on the ground or site plan to indicate the course of the drains (generally without a section).

In draining a building, the chief points to keep in mind are that the drain-pipes used are of good quality; and here I may say that unless the pipes are thoroughly examined, a great many that should not be used will find their way into the work. I have sometimes condemned as large a proportion as 60 per cent. of those brought on the site, and this although sent from well-known manufacturers. Lay down straight lines, and let there be no right-angled junctions. When bends are absolutely necessary, always insist upon bent pipes being used, and never allow a curve to be formed by opening the joints of straight pipes. Let the pipes be not larger than is necessary; see that they are laid on a solid foundation, to a regular and sufficient fall; be careful that if the pipes are jointed in cement, the cement is not squeezed up so as to leave a hard ridge at the joint. Test the

levels thoroughly before the pipes are covered in, and also have the lower end of the drain blocked, and the pipes filled with water, in order to ascertain that the joints are watertight.

I cannot too strongly insist upon the necessity for a thorough inspection of the whole of the pipes after they are laid, and for testing the levels and joints; for it is through the neglect of these precautions more than in any other way that, even where architects are employed, the drains have so frequently failed to answer their purpose. Too often does the architect leave it to the respectable contractor, the contractor leaves it to his trustworthy foreman, the trustworthy foreman is otherwise engaged at the most important time, and leaves it to the handy-man, who has been drain-laying for thirty years, and has laid them badly all the time. Very good work may be made with Stanford's joints. With these joints it is only necessary to use a little Russian tallow and resin, and I think the extra price of the pipe is fully compensated for by the saving in labour and excellence of the joint. Where pipes run under the floors, as they must do in most town houses, I have used iron pipes, coated with a patent preservative solution, invented by Dr. Angus Smith, or treated by Professor Barff's process, the joints being made with lead. I believe this to be the best method. It is a good rule, however, to bear in mind that, wherever it is possible to avoid it, as in detached or semi-detached buildings, no drain at all should run underneath the building.*

A DISCOVERY AS TO LEONARDO DA VINCI.

A PIECE of news comes from the Institute of France which will delight painters, art-critics, and archæologists, and includes a point specially interesting to our readers. It is news of a recent discovery that has been made in the Mazarin Library, and which touches on a very important and, up to the present, very obscure portion of the life of the great painter, Leonardo da Vinci, extending from the year 1472 to 1483. The most complete of his biographers has chosen to represent him to us during those eleven years as visiting the principal towns of Italy, and studying the antique at Rome, Florence, and Milan. This was evidently an hiatus, and has now happily been filled up.

The "Bibliothèque Mazarine" possesses two enormous manuscript volumes by Leonardo da Vinci, and a curious, though not unprecedented, circumstance to notice, *en passant*, is that the writing in them is from right to left, and arranged in such a manner that one is obliged to place them before a mirror to read them with any facility. One must look on this as the eccentricity of a man of genius, who disliked transmitting to parchment in the ordinary and every-day way his secret thoughts. These manuscripts are enriched (to the shame, and yet delight,—be it said,—of artists who have overlooked the treasure) with sketches, wherein the finish of the details and the perfection of the execution are only equalled by the greatness of the conception and the harmony of the composition.

The existence of these folios has been nearly ignored; at all events, they have been but rarely dipped into, and it is Herr Richter, a German, sent by his Government on an archæological mission to Paris, who has had the patience to completely decipher the manuscripts in question. He has been well repaid for his trouble, and his researches have terminated in a result of which he has every reason to be proud. In fact, in turning over page by page of the very voluminous folios, he has found interpolated several autograph letters of Leonardo da Vinci, which throw, it is said, quite a new light over the life of the great painter, and account in detail for the period from 1472 to 1483, of which up to the present time only vague and erroneous ideas had prevailed.

It appears, then, from these documents that during this interval of eleven years, Leonardo was attached to the service of the Sultan of Egypt in the quality of an architect, and that he resided alternately at Cairo and at Alexandria. These letters give us a rather piquant piece of news. The painter of the "Last Supper" turned Mussulman *pro tem.*, so as to gain access to, and be able to study his art in the mosques, of which the entry, difficult even at the present time, was, in the fifteenth century, totally forbidden to those "dogs of Christians." It is not necessary to add that he immediately abjured the religion of Mahomet when his foot touched once more the soil of Italy.

This discovery made by Herr Richter will doubtless lead to others, and it is probable that certain monuments at Cairo and Alexandria, to which archæologists have not been able to attach the exact dates, will thus find the explanation of their origin. Moreover, it is no longer possible to doubt that it was in Egypt that Leonardo, who was not only a painter and an architect, but was also a very superior engineer, studied the science of hydraulics, of which he made such good use at a later date in some of the towns of his native land.

We know that the Egyptians, having had from all time to guard against the inundations of the Nile, as well as to utilise its waters, were the first to construct dams, hollow out reservoirs, and form canals for irrigation. In fact, they studied hydraulic engineering from the remotest period as absolutely necessary to the prosperity and security of their country. Indeed, the folios in question contain sketches of machines, we are told, that would excite the admiration of modern engineers, so that this strange discovery may be of real importance, both in an artistic and scientific point of view.

* The remainder in our next.

SOMETHING ABOUT AN OLD FIRM.

AT one a.m. on Saturday, the 22nd ult., the premises, No. 112, St. Martin's-lane, were observed to be on fire. After some delay, owing to the severe frost, three steam fire-engines and two stand-pipes were brought to bear, under the personal direction of Captain Shaw and Superintendent Palmer, who were early on the spot. The flames were so fierce that in three hours the workshops were gutted, and the up-draught appears to have been such that, although the windows of surrounding property were broken, and even books near them charred almost to cinders, the flames did not spread. Appearances were so threatening that the Guards in the neighbouring barracks were called up, and firemen were stationed with hose upon the roof of the National Gallery. By the falling roof two firemen were severely injured.

The premises destroyed were about 200 ft. in depth, and formerly used as a studio by Sir Joshua Reynolds. They were panelled in oak, and in places the hooks and rods are still hanging to the walls, even though the woodwork is burnt away. The basement was occupied by smiths' forges and fitters' shops; the ground floor was given over to brass-finishers, and the rest occupied as polishers', tinmen's, lacquerers', and repair shops, and a studio. The tools and machinery had recently cost 850*l.* and the whole damage, exclusive of the building, is 7,000*l.*, of which but 1,500*l.* is insured.

Messrs. Gardner, to whom these premises belonged, commenced business in 1752, on the site of their present show-rooms in the Strand. They possess a painting by Canaletti, on one side of which their place of business is represented, almost under the shadow of the sign of the Golden Cross. Men are leisurely repairing broken carts and packing goods in the roadway, and picturesque rows of buildings, now pulled down, stretch up the Strand.

John Gardner, the founder of the firm, was successful in his speculations, especially in whale-oil, and on more than one occasion vessels sailed into port, after two or three years' absence, at singularly propitious moments, enabling him to leave some property behind.

Thomas Gardner, his successor, almost monopolised the lighting of theatres and Government offices, then accomplished, of course, by oil and candles. When, after Waterloo, the allied Emperors visited London, and at the coronation, it fell to his lot to light most of the embassies and Government offices. As this was effected with millions of small oil-lamps, which had to be "chaired" and wired, the task required certain powers of organisation. Throughout the exciting Nelson and Peninsular time, whenever tidings of victory reached the Government, one or another Gardner was roused, most often in the middle of the night, with orders to arrange instantly for the illumination of the Government offices. They were consulted by Sir Robert Peel and other ministers on matters of lighting, until the introduction of gas, which, unfortunately for them they combated, and lived in consequence to see their business slowly transferred away.

Henry and John Gardner resumed, to some extent, the position of Government contractors for lighting, and for many years held important contracts at Woolwich, Chatham, and elsewhere. A very large consignment of gasfittings was made to Sebastopol just before the outbreak of the Crimean war, and many, doubtless, came to a distinguished end at the siege. During the war, "Soyer's magic stove," manufactured and patented by the firm, achieved a great reputation, the celebrated *chef* going out on behalf of the Government to cook the food of the army. Silver stoves were presented to the Commander-in-Chief of the allied forces, and over 20,000*l.* in profit was cleared by the sale of stoves and portable kitcheners alone. Customs have changed since then, for it would scarcely be possible now for native Indian princes to wipe out debts by a mere intimation that a collector's life could not be guaranteed, yet soon after 1851 a powerful prince obtained a gigantic pair of cut-glass candelabras, made for the Exhibition, on these terms. The most conspicuous work undertaken by the firm, however, was perhaps the manufacture of the clock-dials for the Houses of Parliament. The manufacture of the clock itself brought Mr. Dent and Mr. Beckett Denison (now Sir Edmund Beckett) into close communication, and led, on the death of the former, to an action on the part of Mr. Denison to discover a will, alleged to have been made in his favour and deposited at Coutts's. Mr. Henry Gardner, one of the heirs-at-law, successfully defended what became a *cause célèbre*, but the anxiety of the trial brought on an illness from which he never recovered.

The present members of the firm belong to several learned societies, and Mr. De Wylde, the artist of the *Pandora* expedition, is associated with them. They did not actually commence manufacturing on an extended scale until three years ago, the massive bronze triple lamps and drinking-fountain at Gloucester-gate, Regent's Park, being their first public work. Sir Gilbert Scott, immediately before his death, gave them the lighting of two churches, one of them being St. Margaret's, Westminster. Their very first essay at wrought-iron work was the production of the gates for the Leathersellers' Hall, illustrated in the *Builder*, while the extent of the business they have thus rapidly achieved may be gathered from the fact that gasfittings and stoves for the new Leathersellers' Hall were destroyed in the fire to the value of 1,450*l.*, besides the whole of the wrought-iron and brass for the Forfar Episcopal Church, Messrs. Howell & James's new premises, and many minor buildings.

NEW MATERNITY HOSPITAL FOR GLASGOW.

THE Glasgow Maternity Hospital, recently opened, has been erected at the corner of North Portland-street and Rotten-row. Designed by Mr. Robert Baldie, Bath-street, Glasgow, the style of architecture is Early English Domestic Gothic. The structure is three stories in height, and has its chief entrance, by a Gothic arched doorway, in North Portland-street, which has a south-western exposure. Over this doorway the Glasgow coat-of-arms and the dates when the hospital was founded and rebuilt are carved. In addition to the three stories there is a lower flat where the street falls to the south; and there are detached outhouses, consisting of laundry, washing-houses, disinfecting-rooms, &c. The ground floor is occupied by a hall, the matron's parlour and bedroom, the resident doctor's room and bedroom, a dispensary, the board-room, and the reception-room. The first and second floors are utilised as wards for patients and nurses' rooms. The wards give accommodation for eighteen patients on each floor, allowing 1,500 cubic feet of space for each patient. The upper floor consists of sanatorium and bedrooms for pupils, nurses, and servants. Over the doors to all the wards are hinged fanlights, so as to admit of a thorough current of air when that is necessary. The lavatories for the several floors are placed in a wing behind, and are entirely disconnected from the main building, having a well-lighted and ventilated lobby between them and the hospital, cut off by double doors. Everything about the fittings is plain and substantial.

Messrs. A. & J. Stewart were the masons; Messrs. Allan & Baxter, joiners; Messrs. John Craig & Son, plasterers; Messrs. Brown &

Young, plumbers; Messrs. John Morrison & Son, slaters; Messrs. A. & J. Scott, painters; Messrs. Meikle & Son, glaziers; Messrs. Kean & Wardrop, encaustic tilers; and Messrs. J. Cormack & Son did the heating. The work was executed under the superintendence of Mr. Thomas Scott.

RIDLEY HALL, CAMBRIDGE.

Ridley Hall, Cambridge, is a theological institution for training men who have taken their degrees for holy orders, and is designed to supplement the teaching they have already received at the University.

The building comprises a principal's residence, twenty sets of rooms for students, porters' rooms, library, dining-hall, common room and office, and vice-principal's rooms.

The library is a lofty room, 41 ft. long by 22 ft. wide, and 20 ft. high. It is connected with the principal's study, and will be used as lecture-room as well as library. It has a panelled pitch-pine ceiling, and the doors and panelled dado are of oak. It is already furnished with a goodly number of theological works, most of which were bequeathed by the Rev. E. Carr, one of the founders of the institution, after whom the library is named.

Each student has a bedroom and sitting-room, the former about 13 ft. by 10 ft., and the latter 13 ft. by 11 ft. 6 in.

The three sets of rooms over the gateway in the tower are larger than the others.

The dining-hall will be 42 ft. long, by 22 ft. 6 in., and 17 ft. high to the wall-plate. It will have an open-timber roof, and will be lighted at the end by a large stone bay window, and at the sides by five two-light cusped-headed windows. The dining-hall will be approached by a broad stone flight of steps, which also communicates with the common room, a chamber, 22 ft. 6 in., by 22 ft.

The kitchen and other offices are below, and will communicate with the dining-hall by a lift.

The total length of the principal front is about 200 ft.

The building is faced with red Chylton bricks and Ancaster stone dressings, and the roofs are covered with Broseley pressed tiles.

The site of the building is at Newnham, close to the back of Queen's College, and contains about two acres of ground.

The total cost of the building will probably amount to about 18,000*l.*

The architect is Mr. C. L. Luck, of Carlton-chambers, Regent-street; the builder is Mr. G. Dobson, of Colchester; and the clerk of works is Mr. G. Lett. The carving was executed by Mr. Earp, of Lambeth.

In consequence of the munificence of a lady (Mrs. Gamble, of Torquay), who has presented a sum of 3,000*l.* to build the dining-hall, &c., the committee will be enabled to complete the building at once in its entirety.

ANCIENT VIADUCT AT ROTHENBURG, BAVARIA.

Few examples are to be met with of what we call "engineering works," dating from the Middle Ages. There can be no doubt that the distinction between engineering and architecture was one quite unknown to our ancestors, and that with them the architect and the engineer were probably the same person. Engineering works were not carried out on such a stupendous scale as they are nowadays; but it would be a mistake to suppose that the Mediæval architects were ignorant of such matters. The fact is, they knew all that was necessary for their purposes, and probably a great deal more than we give them credit for. One very extraordinary fact must strike all those who are in any way conversant with the history of the Middle Ages, and that is the way in which they seem to have overcome difficulties. If they wanted a thing in the Middle Ages, or thought they wanted it, they got at it somehow or other, and we may be sure that if they had required vast engineering works they would have found out how to execute them. In fact, the dykes in Holland seem to show that when engineering works were absolutely necessary, they were undertaken regardless of labour and cost.

That the Mediæval architects were good engineers is proved beyond dispute by such works as the bridges of Prague, Frankfort, Wurzburg, and, above all, Old London Bridge,—the last-named structure, though, of course, unsuited to the wants of our time, was really an extraordinary example of engineering skill; and although it had existed for about 650 years, yet at the time of its destruction it was in a thoroughly-sound condition, except in the centre, and the weakness at this point was not caused by any oversight of its original constructors, who placed a gigantic pier, in the centre, but by the folly of their eighteenth-century critics, who, with the conceit peculiar to that age, unhesitatingly condemned the method pursued by the twelfth-century architect, Peter of Colechurch, removed his pier and substituted an arch in its place. From that time to the year of its final destruction, the centre part of London Bridge was always dangerous and insecure, and while Peter of Colechurch's bridge stood for six centuries and a half, and would have probably stood for several centuries more if it had been left alone, the bridges erected in London by the wise men of the eighteenth century all went to grief within a hundred years of their erection, and had to be cleared away to prevent their falling down.

The singular viaduct which we illustrate is built across the river Tauber, a somewhat insignificant stream, although it forms the boundary between two kingdoms, those of Bavaria and Wirtemberg. Though insignificant as to size in its normal condition, during early spring the Tauber becomes a raging torrent, sweeping everything before it, so that any bridge built across it must be possessed of great strength, or it would soon be washed away by one of these spring floods. The bridge or viaduct at Rothenburg is said to date from the fourteenth century. Whether the upper row of arches is of the same date as the lower may be questioned. At first sight it appears as if this upper row of arches had been imposed regardless of constructive consideration, but more careful examination will show that this is not the case, and that although the piers do not occur immediately over those below, yet they are placed in such a position as not to load the centres of the lower arches. The lower piers, it will be observed, are pierced with small arches, just above the starlings, in order that they might allow a larger water-way at flood time, and so offer less resistance to the current.

We have frequently referred in these pages to the town of Rothenburg, and some idea of the general effect of that most interesting place may be gathered from our sketch. The great church seen to the left is the noble Protestant *pfarr-kirche* of St. James, celebrated for its magnificent altars, one of which we have illustrated, and for its fine old stained glass. Its peculiar stone spires are here seen to full advantage; they are probably the very ugliest works ever erected during the Middle Ages; their enormous finials look almost like a caricature of the rage which the Germans always had for exaggerating the size of this feature,—a defect which the builders of Cologne have not altogether avoided. Near to the church of St. James is seen the lofty tower of the Rathhaus, and further to the right the curious Roman Catholic Church of St. John; the ancient walls, and a fine gate with its barbican, close the view to the extreme right. In the valley is the other Roman Catholic church of the town, the dedication of which has escaped our memory. This building was for many years occupied as a barn, but King Ludwig of Bavaria purchased it and restored it to religious uses.

CHORLTON UNION NEW OFFICES.

This design was selected in competition for new offices by the Guardians of the Chorlton Union. It having been decided by the Board to erect new offices, in consequence of the present premises not being adapted to their requirements. The authors are Messrs. Maugnall & Littlewoods, of Manchester. The building is situated at the junction of Grosvenor-square and Cavendish-street, on the old site, enlarged by taking in the premises occupied by the Nursery Institute, thereby making a frontage of over 100 ft. to each street. The old buildings are now cleared away, and the Guardians have accepted Mr. James Herd's tender, amounting to 9,537*l.*, and he is proceeding with the new works.

The ground-floor is devoted to the administrative department. The principal entrance is from Grosvenor-square, and leads to the various offices, being used by the Guardians and by people who have business with the Board. The entrance for the poor is from the loading or cart-way, which is placed in Grosvenor-square, at the north end of the plot. The entrance for vagrants is from Lyceum-place. An iron gate, fixed in the loading way, separates the vagrants' portion from the rest of the building, and it will be the duty of the porter to close this gateway at six o'clock each evening, thereby keeping vagrants entirely isolated from the rest of the occupants. To the left of the principal entrance first described, after passing through the vestibule, which will have glass doors, will be Mr. Edgill's office, with an ante-room adjoining to a passage communicating therefrom to the registrar's offices, which will be of ample size, with a large-sized fire-proof room for the storage of books and documents, and with a private room, also immediately adjoining the registrar's office, which will be used principally for the registration of marriages; a waiting-room on the right of principal lobby, adjoining to the porter's room, will be used by persons waiting to see the officials upon that business. Adjoining to the porter's room is a small room for stationery, &c. Further along the principal lobby is the room appropriated to chief and second clerks, for the paying and receiving of accounts. A waiting-room is placed between these rooms, and is convenient to both. There are lavatories and water-closets, &c., on the right hand of the lobby. The principal staircase rises from this lobby to the floor above.

To the front of Grosvenor-square are placed the six rooms for the relieving-offices, each of which is in immediate communication with the waiting-room for the outdoor relief poor; each office will be so arranged that there will be two entrances, and two applicants for relief can be heard at the same time, although out of sight of each other, yet so placed as to be seen by two guardians on relief-days at the same time. The applicants would then leave by the passage leading direct to the loading entrance, and would either get their relief-ticket for provisions, or money from the pay-clerk, as the case may be, and would leave without again coming into communication with the rest of the applicants. The out-relief store and pay-clerk's office are placed between the entrance and exit doorways to the general waiting-room.

The first floor is chiefly devoted to the use of committee-rooms, board-room, &c. The Board-room is placed at the junction of Grosvenor-square and Cavendish-street, and is lighted from both streets, an oriel window being introduced at the angle, which recess is not only convenient, but assists to give some character to the room at no great expense. The Board-room is 36 ft. by 29 ft., and is 21 ft. in height: the upper portion is of circular form, and raised above the square of the general eaves of the building. This extra height of the room is obtained in the formation of the Mansard roof, which is purposely introduced so as to give the extra height.

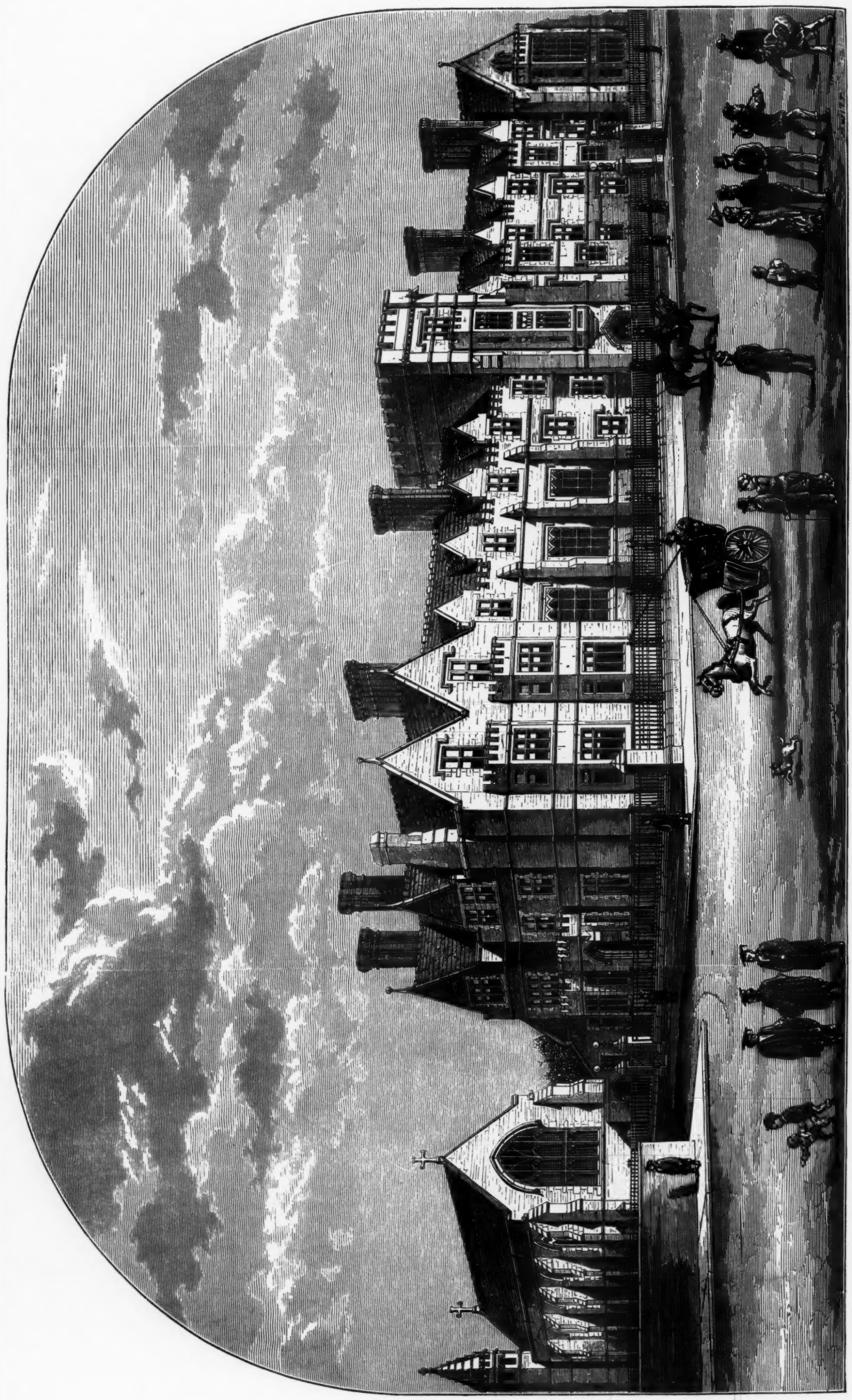
Two waiting-rooms adjoin the board-room, and also the committee-rooms. The room for the school attendance officers is on this floor, likewise the warrant and commitment officers' room.

The front portion of the basement, and that portion under the large waiting-room, will be devoted to rooms for the use of the outdoor relief poor, and will be chiefly used as workrooms during times when the workhouse is crowded, or in winter and severe times of distress, when a large number of the poor could be here found means of employment either in oakum-picking, cutting up wood, or some other such indoor employment. A kitchen and large scullery or washhouse will be provided in the basement.

The vagrants' wards are situate at the back of the main building, and will be approached from Lyceum-place by vagrants who, as previously stated, will be prevented (by an iron gate, as previously mentioned) from passing through to the front of the building. The superintendent's office will command the entrances for both males and females.

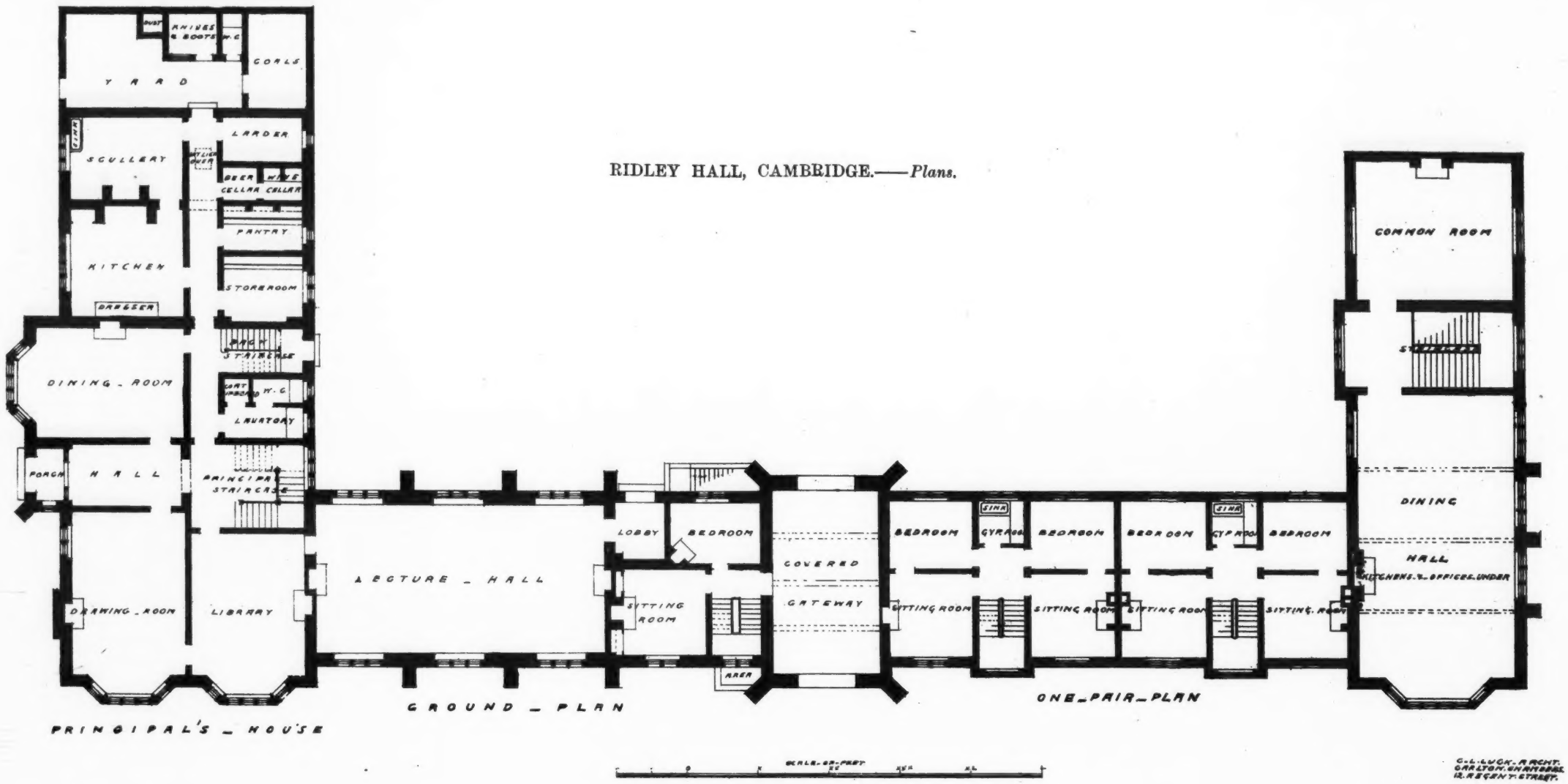
The men's workrooms are placed on the ground-floor and also on the basement-floor.

The elevations to Grosvenor-square and to Cavendish-street are Italian in character. The walls will be constructed of brickwork, upon a Yorkshire stone base, the facing executed in pressed stock brickwork, with masonry sparingly introduced where most required to throw off the water, namely, to string-courses and sills, and to the upper portion of cornices. The rest of the moulded and ornamental work will be executed in red terra cotta.



RIDLEY HALL, CAMBRIDGE.—MR. C. L. LUCK, ARCHITECT.

RIDLEY HALL, CAMBRIDGE.—*Plans.*



C. L. LUCK, ARCHT.
CARLTON CHAMBERS,
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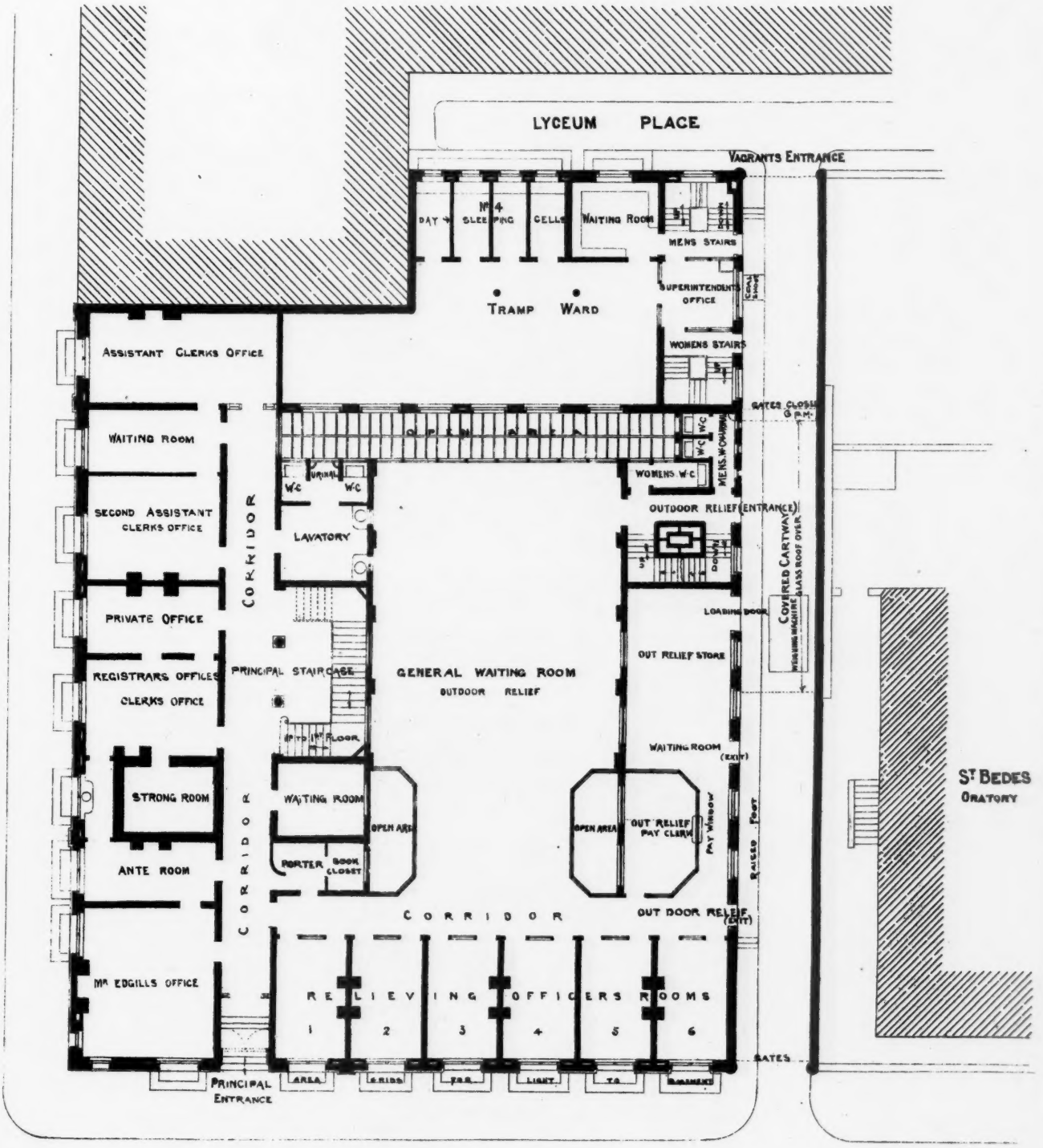
CHORLTON UNION: PROPOSED NEW OFFICES.——MESSRS. MANGNALL & LITTLEWOODS, ARCHITECTS.

CHORLTON UNION

PROPOSED NEW OFFICES &c



GROUND FLOOR PLAN

SCALE OF FEET

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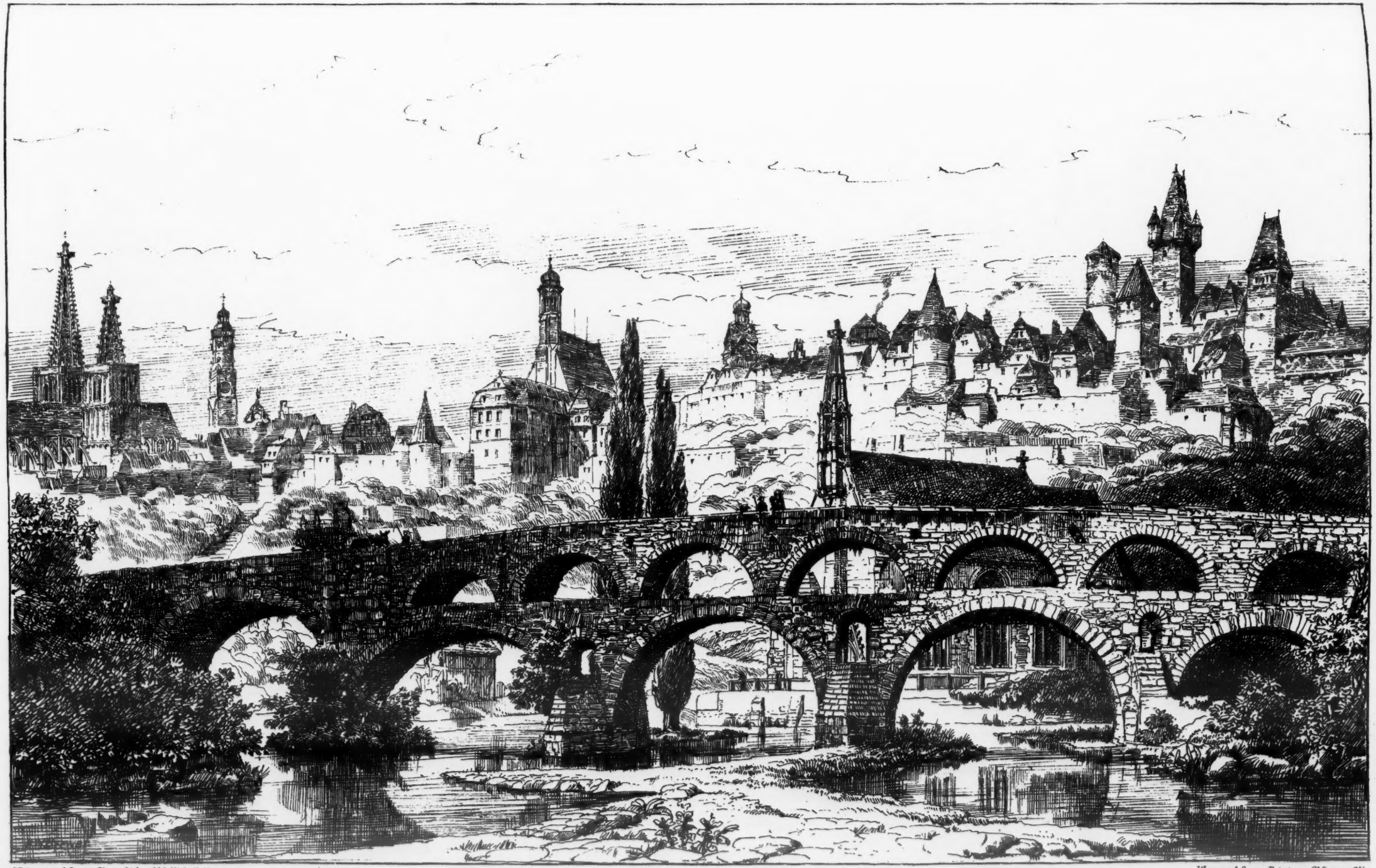

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ANCIENT VIADUCT AT ROTHENBURG, BAVARIA.

MONUMENT TO DON PEDRO CALDERON DE LA BARCA, MADRID.

SEÑOR DON JUAN FIGUERAS, SCULPTOR.

MONUMENT TO CALDERON, THE SPANISH POET, MADRID.

GREAT preparations are being made in Madrid for the commemoration of the bicentenary of Calderon. A Junta Directiva has been formed, under the presidency of Señor Canovas del Castillo, and all classes seem to share in the desire to do full justice to the great poet.

In connexion with this movement we give a view of the monument erected, not long ago, in Madrid to the memory of the immortal author of "La Vida es Sueño" (Life is a Dream). It stands in the Plaza del Principe Alfonso, fronting the Teatro Español. It is of Carrara marble, and in the style of the last epoch of the Renaissance. It was a happy idea to represent Calderon seated, as, by placing him in a standing position, the sacerdotal character would have absorbed all importance of the poet. The figure of Fame adds to the merit of the monument; without diminishing the importance of the principal part it enriches the background. In the lower part of the pedestal are bas-reliefs illustrating scenes of interest from the works of Calderon, and, by the disposition and relief of the figures, there has been obtained that chiaroscuro which is indispensable in architectural ornamentation. The combined effect is found satisfactory, although, in the opinion of competent critics, it might have been still more so if those material elements which are necessary for carrying out ideas had been placed at the disposal of the sculptor.

Señor Don Juan Figueras, the author of the monument, having been proposed in 1873 for the pension of merit for sculpture in the Academia de Roma, created by the Government of Señor Castelar, he was bound, under the regulations, to complete the execution of a sculptured group in marble within a period of three years, and to represent some celebrated personage of Spanish history. Señor Figueras chose for his subject the immortal Don Calderon de la Barca, whose memory his able chisel has perpetuated with general approval.

Acting on the advice of the late Señor Lopez de Ayala, the Spanish Government presented to the municipality of Madrid the group in question, and the latter public body entrusted to Señor Figueras the execution of the base, a charge which he accepted, and the completion of which justified the act of the municipality.

ARCHITECTURAL ASSOCIATION.

ARCHITECTS AND SANITATION.

AT the ordinary meeting of this Association on the 4th inst., Mr. E. C. Lee, president, in the chair, a vote of thanks was accorded to Messrs. Boulnois & Warner for permitting the members of the Association to visit the Standard Life Office, King William-street (described by us last week), and it was announced that this Saturday, the 11th, a visit would be paid to the North London Hospital for Consumption, Hampstead. [A view, plans, and description of this building, of which Mr. T. Roger Smith is the architect, appeared in the *Builder* for Dec. 25 last.] It was further announced by the president that the librarians had undertaken, with the consent of the committee, to enlarge the time of attendance at the library during the remainder of the session in order to meet the convenience of members generally; and if the alteration should prove advantageous it might thereafter be permanently adopted. On and after this Friday, the 11th, the library will be open on each occasion for one hour, viz., from 6·30 to 7·30 p.m. on meeting evenings, and from 7·15 to 8·15 p.m. on class evenings.

Mr. Ernest Turner then read a paper on "The Sanitary Work of an Architect," the first half of which we print on another page.

In the discussion which followed,

Mr. Rogers Field, C.E., expressed his pleasure at having heard the paper, which was admirable and to the point. The one thing which architects had to do to enable them to deal satisfactorily with sanitary matters was to master the principles of sanitation, and to bear them in mind and apply and adapt them to varying circumstances. The principles of good drainage were so exceedingly simple that they were very generally overlooked. One of the greatest perplexities in the present day to those who troubled themselves about sanitation consisted in the enormous number of patented and other appliances in the market, rendering it a matter of difficulty to some to know what to chose and what to reject. There was only one way out of that difficulty, and that was to master the principles of good sanitation and to choose only those appliances which conformed to them most completely in fulfilling the purpose they were professedly intended to fulfil. The D-trap had been mentioned as being a bad appliance; why was it bad? Because from its very construction it could never convey away all the foul matter put into it, but would always retain some. Every appliance in the shape of water-closet or trap ought to allow of everything being washed clean away by flushing. Sometimes foremen would say to him that, after all, there was nothing like the old-fashioned square brick trap, with a good stone dipping down into the water. Well, so far as the dip was concerned, that was a very good trap, but it retained foul matter, and was therefore bad. Why was it, again, that the pan-closet was a bad appliance? Simply because its "container" contained foul matter, and could never be thoroughly washed out. With reference to Stanford's patent joints for drain-pipes, they were very good in themselves, but he had found in practice that the pipes were apt to vary in size, and unless the pipes were all of the same size there would be difficulty in insuring that the drain should be watertight, even with Stanford's joints. The course recommended by Mr. Turner, of blocking up the lower end of the drain and filling the latter with water to see if it be watertight, should never be omitted, for, as he had shown, the greatest care and precautions should be taken even when using the very best appliances. The speaker mentioned, as an instance of the strange ideas that possessed some who called themselves "practical men," the case of a man who, because he had found that badly-made cement joints to drain-pipes sometimes caused obstructions to the flow of sewage, and that clay was of no use as a permanent jointing material, came to the conclusion that it was better not to attempt to make joints at all, and carried his reasoning into actual practice! He endorsed what Mr. Turner had said as to the use of small *versus* large pipes for drains, and also what had been laid down as essential for getting to the drains for inspection and cleansing when necessary, viz., the provision of a manhole or manholes, for there should be no necessity to break ground or disturb the basements of buildings in any way in order to examine or cleanse the drains. He was sorry to know that some architects and engineers were not yet alive to the importance of this point. Only the other day he saw a report by "an architect and engineer" as to the drainage of a large institution, and in that report the following words occurred,—"The great difficulty with reference to pipe-drains is that they require to be periodically opened and examined. It is a great mistake to break into them, and therefore I suggest that you put inspection caps on the tops of them." What a radical mistake it was to break up the ground to get at the inspection-caps indicated. Where a drain was once properly laid, there should be no necessity to disturb the ground to get at it.

Mr. Hayes, in moving a vote of thanks to Mr. Turner for his paper, said it had been laid down, almost as an axiom, that it was necessary that no cistern which supplied the house with water for drinking and culinary purposes should have any connexion with the water-closets. Now, he could see that where the pipes leading from the cistern to the closets were enclosed in a wooden casing or boxing it would often be possible for effluvia from the closets to be conveyed to the cistern along the *outside* of the pipes up the casing, but he should like to know whether, in the absence of such casing, there was any danger whatever of the cistern being contaminated through the inside of the pipes, especially where the small water-waste preventing cisterns intervened between the cistern and the closet-pan? If not, one cistern might be used for the common supply.

Mr. G. J. Symons, F.M.S., said there were so very few points in the paper upon which he differed from the author that he would essay a reply to the question put by the last speaker. He thought that the general principle which had been laid down by some sanitarians, that under no circumstances should the same cistern that supplied the water-closets supply the drinking-water, was a sound one; for although, under some conditions, the chance of contamination might be remote, our drinking-water ought to be, like Cæsar's wife, entirely above suspicion. It was surely not an insuperable difficulty to provide two cisterns in a house,—if we *were* to have cisterns rather than the long-talked of constant service. He was not prepared to demonstrate how the water in a cistern could get contaminated under such circumstances as those supposed in the question, although he could conceive of the possibility of such a thing happening.

Mr. William White, F.S.A., said that Mr. Turner had presented a most instructive paper, and he begged, therefore, to second the vote of thanks. There were many details upon which sanitarians were not yet agreed; whether they ever would be agreed upon them he did not know; but it was hoped, sooner or later, they would all be agreed upon broad principles. The question raised by Mr. Hayes was a case in point. In many houses it would certainly be very difficult to get two cisterns in different apartments,—for unless they were in different apartments it would be of very little service, as he took it, to separate the supply. He was inclined to think that a feed-cistern intervening between the main cistern and the closet would be, if properly arranged, sufficient to obviate the likelihood of contamination of the cistern by the closet. He did not agree with Mr. Turner in his implied preference for valve-closets rather than wash-out closets, for he thought that a wash-out closet of some description or other was *the* closet of the future, and the only kind which was likely to be approved of by future sanitarians. As Mr. Turner had been good enough to refer to the closet which he (Mr. White) had devised, he might mention that one of what he regarded as its merits was that it had a water-waste-preventer which might be made of any capacity up to six gallons, although he found that from two to two gallons and a half were sufficient to wash out the basin.

Mr. Griffith, C.E., agreed with Mr. Turner in saying that the use of D-traps, pan-closets, and all such defective, because filth-retaining, appliances, should be discouraged most strongly. With reference to the numerous appliances and patented systems that were advertised, 99 out of 100,—yea, 999 out of 1,000,—were useless, or, at any rate, were not better than (and many of them not so good as) the most simple means which could be applied by any one having a knowledge of the principles of sanitation. If the house-drains were made with a proper fall, and with sufficient means of flushing, the contents of the water-closet basin should pass immediately into the sewer, and if the sewers were all of them properly constructed so as not to retain deposit, the sewage should be delivered fresh at the outfall, whereby its value as a manurial agent would be very much greater than that of the putrid sludge now delivered. Thus economy, and efficiency in a sanitary point of view, would go hand in hand, for if all sewers and house-drains were clean and properly ventilated, there would be no such thing as sewer gas. With regard to the architectural profession, he did not think that it had been twitted with neglect of sanitary principles without just cause. Even at the present time, architects as a body paid very little attention to the drainage of the buildings they designed. He had recently examined some new West-end houses,—one of them had been sold for 12,000*l.*,—in which pan-closets and D-traps were used, and in which the waste-pipe from the safe under the closet was carried direct into the D-trap, the soil-pipes being, as a matter of course, unventilated. When houses of that character were found, they did not say much for architects' care for sanitation. Indeed, he might say that he had never seen houses recently built that were properly drained, unless the work had been done by a "specialist."

Mr. Riddett said that the last speaker had thrown a little mud at the architectural profession, in whose defence he desired to say a word. He regarded Mr. Griffith as a specimen of the very interesting, though not very uncommon, type of people who, when anything was wrong with the houses in which they lived, always blamed the architects, forgetting,—indeed, being ignorant of the fact,—that in ninety-nine cases out of a hundred an architect had nothing to do with the erection of the dwellings of the people. It was quite true that in some districts (for instance, the locality called "West Kensington,"—it ought to be Hammersmith) an architect was nominally employed, but to what extent? Simply to get out a design for the elevation which the builder had to work to, and there his liability in connexion with the matter ceased, for he never saw anything more of the job.

That was a state of things which could not be too generally made known.

Mr. E. C. Robins, who was invited to contribute to the discussion, said he had had so many opportunities of late elsewhere to relieve his mind on the subject that he would not intrude further on the time of the meeting than to say that he knew Mr. Ernest Turner had paid a great deal of attention to sanitary matters, and that he was glad the Association had had such a paper on the subject from him.

Dr. Lennox Browne, F.R.C.S., Lecturer on Hygiene at Trinity College, London, adverting to what Mr. Turner had said about ventilation, said it might strike some people as strange and peculiar that smallpox, typhoid, and many kindred diseases were so much more prevalent in winter than in summer; but the explanation was that in summer people breathed purer air because they had their doors and windows open for ventilation. In winter time, however, the external air was felt to be too cold to be freely admitted, and hence people breathed air that had been previously respired.

Professor Kerr said he had the advantage in appearing before that meeting of not being very much interested in drainage; but he was interested in the honour and usefulness of the architectural profession, and he was very glad indeed to find that the important subject dealt with in the paper that had been read had at last reached the stage of being seriously discussed by architects. He gave due honour to those gentlemen who were "specialists" for what they had already done, but he begged leave to inform them that the architects would do better than they, by reason of the fact that no one could possibly undertake, with any confidence, to deal with any subject connected with the construction of a house (which was now a most complicated matter) without understanding in minute detail every corner of that house. "Specialists," ingenious as they might be, and useful as they were, would, he hoped, be made presently to feel that there was no room for their labours inside houses and buildings erected under architects' supervision. He gathered from some of the speakers, and from Mr. Turner, whose paper commended itself to his (the Professor's) mind as one of the best he had ever heard on the subject,—that the first point specially insisted upon was what was called "disconnexion." In other words, it was sought to impress architects with the necessity of disconnecting their houses from direct communication with the pestiferous system of sewers which the engineers had constructed. By all means let them do so,—and they could find several means of doing it. As to the internal arrangements of the house, he had said before, in another place, and he repeated it now because he knew that it took a great deal of iteration to impress a thing upon the public mind,—he would have all water-closets, pipes, and plumbing arrangements turned out of the house, so that there should be no chance of a foul sewer contaminating the air of a house. He did not profess to know why a sewer should not be clean,—he left that to the engineers,—but he had a strong objection to all the complicated apparatus now so generally introduced into houses. Let them consider what a state London was in through the recent severe frost. How many hundreds and thousands of water-pipes had burst? How many water-closets would not work? How many families were without water? How many boilers had burst? Now who was at the bottom of all that mischief? [A voice: "The architects!"] It was all very well to say "the architects," but in point of fact the blame rested with the plumbers, the "scientific" engineers, and the inventors of a mass of complicated apparatus so vast as to lead to the inference that the chief end of man was to deal with smells. Since he spoke at the Institute on the subject he had given further thought to the matter, and he could not see why there should not be a good large shaft going from bottom to top of the house, and opening into the air. In that shaft he would carry all pipes, hot water, cold water, soil, gas, and wastes, as he believed was done in America. The shaft should not be in communication with the house, although it should be easily accessible at every point. If the drain were to be carried under the house, let it be in a subway communicating with the foot of the proposed shaft. The expense of such an arrangement would be quite inconsiderable compared with the expense in which some "specialists" involved their clients. Architects were quite competent to deal with the sanitation of houses. Plumbers had too often had *carte blanche* to deal with houses, and had perfectly ruined their healthfulness. He believed that Mr. Griffith was an exceedingly able man as a specialist, but the question was whether an architect was ever employed in the erection of the house mentioned by him? While defending architects as a body against the charge of indifference to sanitary matters, he (the Professor) knew that there were some architects who did not pay attention to them. Indeed, in the first book he wrote (now a good many years ago, it was true), he remembered that he drew a contrast between the satisfaction of dealing with matters of high art and with the perfectly contemptible business of dwellings.

Mr. H. H. Collins thought that Professor Kerr was, with his usual modesty, unjust to himself, because the book referred to by him would be found to contain a great deal that had been given utterance to in the paper and discussion. He (the speaker), although he had given considerable attention to sanitary matters, did not consider himself a "specialist"; he was content to be looked upon as an architect, but as an architect he thought it his duty to make himself conversant with the principles of sanitation, so that, to the best of his power, the buildings he erected might be healthy. He agreed with Mr. Turner and others in condemning the so-called "water-waste-preventers," the use of which was now enforced by the water companies. If he employed a "specialist" at all, that specialist should take the shape of a good clerk of works, upon whom dependence could be placed, to see that drains were properly laid and jointed. In his practice he packed the joints with tow or gaskin, and then filled them up with cement from the outside. To see whether the pipes when jointed were clear of obstruction he had a candle held at one end of the drain and a looking-glass at the other, and so was enabled to get a view of the interior of the drain. It was of great importance that the architect should make proper plans of his drains for future reference. In many instances, for the disconnecting manholes advocated by Mr. Turner disconnecting traps such as Potts's might be economically substituted. For sinks, &c., he preferred the Bower trap to the syphon trap. After all the necessary abominations (as Professor Kerr called them,—though perhaps the shaft proposed by him would be a greater abomination than anything yet attempted) had been fitted up, it would be difficult to get them properly attended to and kept in order. In many instances within his own knowledge complaints of bad smells had been made where the best appliances and methods of drainage had been adopted; but in such cases he had invariably found the cause to be ignorance and want of cleanliness on the part of domestic servants.

Mr. J. Douglass Mathews said it was one thing for architects to know how drains should be laid, and quite another to get their instructions carried out. It could hardly be expected that the architect could personally watch the laying of the drains of the buildings he erected. If "specialists" were wanted at all, they were rather wanted in the form of respectable and intelligent tradesmen who would undertake the execution of all such works in the best possible manner. Such men should be perfectly reliable and conscientious in their work, and should be paid for it at a rate that would allow them a somewhat larger percentage of profit than that gained by ordinary tradesmen.

Mr. Turner, in replying to some of the points raised in the discussion, said he thought that where a water-waste preventing cistern intervened between the main cistern and water-closet, and where the overflow-pipe was carried out into the open air as a warning-pipe, practically disconnexion of the cistern and the closet was obtained, and little danger of the water getting contaminated from the closet was to be apprehended. Professor Kerr had, no doubt justly, deprecated the notion that the chief end of man was to deal with smells, but unfortunately one of the chief causes of the end of many men's lives was that they did *not* deal with smells. Potts's disconnecting trap, and others similar to it, were very good, but they did not offer the same facilities of inspecting and cleansing the drains as were offered by manholes. He was unable to agree with Mr. Mathews in saying that an architect could not be expected to superintend the drainage of his buildings. Why not? Why should he not superintend the laying of the drains as well as the construction of his building generally, including the execution of such details as mouldings and other decorative features?

The next meeting of the Association will be held on Friday evening next, the 18th inst., when Mr. E. J. Tarver will give an account of the visit paid to Lombardy last autumn by some of the members.

THE ARTISANS' INSTITUTE AND TECHNICAL EDUCATION.

A WELL-ATTENDED meeting of the members of this Institute, in Upper St. Martin's-lane, was held recently, to hear addresses from several gentlemen interested in the advancement of technical education. Sir Philip Cunliffe Owen presided.

Mr. Hodgson Pratt (treasurer), after reading letters from various gentlemen, regretting their inability to attend, referred to the objects of the Institute as being the "systematic instruction of apprentices and workmen in the principles of art and science, forming the basis of various handicrafts, and in the technical application of those principles to actual work," and pointed out that, for a long time, there was hardly any other institute which attempted to do the special work which was done by the Artisans' Institute, and that the special work was done there at the suggestion of the artisans themselves.

Sir P. Cunliffe Owen said it afforded him great pleasure to be there, and greater pleasure still to have heard that the Institute owed its existence to the suggestions of the mechanics themselves. He might say that he had had some experience of the mechanics of this country, and being a working man himself he fully believed in their common sense, and in their desire for self-improvement. They were seeking opportunities of gaining that instruction which they felt they must have if they were to compete in their various trades with the world generally. They had seen the competition going on in the international exhibitions, and though it was well known that our country came out, he might fairly say, nearly the first during the Paris Exhibition of 1878, yet the verdict of his five hundred friends who favoured him with their visit to Paris was that, though they had nothing to fear from what they saw, it was necessary for them not only to hold on to what they had got, but to go on improving, or they would lose the position which they felt they held at that particular time. What was the position of the French people who took part in that Exhibition? They were astonished to find what England had shown them. They were inclined to pooh-pooh the idea of anything coming out of Great Britain; they thought that the world was always to go over to Paris. He had been recently visited by a partner in one of the very large cabinet-makers' shops in the Faubourg St. Antoine, where all the Parisian furniture was made. That gentleman announced that he was sent to buy English furniture, as their efforts to make it in Paris had not been very successful. Was not that an encouragement to them to believe in their ability to compete with the world, if necessary, in the peaceful and happy industries which were the life and soul of our existence? On the Champ de Mars, which was wrongly called the "field of blood," as it had proved to be the field of human industry, there were represented some sixty or seventy thousand industries, and if they thought of the numbers employed in producing those objects, they could realise what a prodigious amount of labour and skill they represented. He did not wish to say more about what Englishmen had done, as he could not ignore the fact that, respecting technical education, they had done very little. He had been much interested in going through the class-rooms, and he admired the earnestness of those men who were endeavouring to teach the students how to become perfect all round in the profession which was their honour and glory. He thought that Englishmen had such a thoroughness in all that they did that if they put their minds to the task before them they succeeded better than any other people in the world. He was rather frightened at the notion of giving them what they called an "address," as his business was not talking, but working, like themselves; yet he was glad of the opportunity of coming amongst them, and seeing things which were encouraging in that work which he had before

him. This year would probably be the last in which they were likely to hold their classes in that building, but many of them would remember that that was the cradle of their institution. When they were transplanted to Finsbury-square, and possessed all the advantages which the liberality of the City Guilds would afford them, it was to be hoped that they would remember those who had taken an interest in them in the past, and seek to encourage their fellow-workmen to take part in those classes, and endeavour to better their position in life in a way that would add much to the honour and glory of England as a great industrial and manufacturing nation.

Mr. Thrupp reminded them that the object of these classes was to supplement the work that used to be done by the master among his men, and hoped they would adequately appreciate the services of those teachers who were devoting themselves to the work of technical education. He hoped also that all those who had anything to do with this movement would remember that no great advance could be made so long as the only hours devoted to it were those in the evening.

Mr. Magnus, as representing the City Guilds' Institute, remarked that though it was not quite clear at present what exact form the Artisans' Institute might take in connexion with the new Institute, it had been considered very desirable that its future should be looked into by a committee, and he hoped that their deliberations would lead to a satisfactory result. He was quite certain that the good work which had already been done by the trustees of the Institute, and which had been so well exemplified that night, would not be allowed to languish in the effort which was being made in the city to promote technical education. The objects of the City Guilds' Institute were to provide instruction in those principles of science and art which underlie a large number of trades. He might say at once that it was not the object of that Institute to establish trade schools in which carpenters should be taught to be carpenters, or masons taught to be masons, so as to render apprenticeship unnecessary. In order to do that it would be imperative that that Institute should establish all over the country a large number of different schools adapted to different special trades. Its object was not to abolish altogether apprenticeship, but rather to supplement it by teaching more thoroughly than in workshops those principles of art, and such a knowledge of geometry and science generally, as are applicable to particular industries. He believed that one of the greatest benefits which that Institute had already conferred was to awaken a desire in the provinces to establish there colleges and schools for the promotion of techical education. He returned the other day from Nottingham, and he was delighted to find that the public spirit of the town had been such as to lead them to erect a college, with which he did not think any college in London could be said to compare for the efficiency of its various appliances for teaching science. That college had been erected at an expense of 60,000*l*. That alone he considered a very satisfactory result, but if they turned to other provincial towns they would see the same thing. In Leeds there existed the Yorkshire College of Science, in which there was one department which had been endowed exclusively by the Cothworkers' Company for the purpose of teaching the art of dyeing. These were the colleges that were required throughout the country, where not only science and art should be taught, but the staple indusiry of the particular town in which they were situated. They were about to establish a large college in the neighbourhood of Finsbury, and their object was to teach not only chemistry, physics, and mechanics, in so far as those sciences were applicable to a great variety of industries, but also the staple industry of the district, which was cabinet-making. With regard to the work he had seen in the Artisans' Institute, he could only express himself as greatly satisfied. He thought it spoke exceedingly well for the care and attention which had been bestowed upon it by the teachers, and for the direct influence which had been exerted by the trustees. He should like to re-echo the words of the last speaker with regard to the great importance of commencing their technical training at an earlier age than that which was customary at present. He thought they would all be ready to concede that just as the age at which they could best train the intellectual faculties was the age of youth, so they would admit that the ages at which the hand and eye could best be trained for the work in which they would be engaged were those between twelve and fifteen. No doubt classes open to boys in the day-time would ultimately be establ shed throughout the metropolis, and he would urge every parent interested in the subject to cause his son to attend these classes so that he would not experience the want of that technical education which it was the object of the projected institutions to supply.

Mr. Trueman Wood said that it was his fate a few years ago to stand in almost an unhappy relationship to the Artisans' Institute, as he had occupied the unfortunate position of the candid friend. It became his duty to prepare a report for some of the City Companies on the subject of technical education, and in doing so he felt bound to refer to the work of the Institute. He said then what he believed to be true in regard to it, but he was afraid that it was not quite so laudatory as it might have been. He believed that the Institute was extremely valuable as showing what mechanics and artisans really desired and aimed at. It was an old saying that nobody could tell where the shoe pinched except the man who wore it. It was the older artisans who felt the want of technical education, and who were determined that it should be supplied to their children, who on their part did not mind attending school again for a while, in order that the prospects of their future life might be well assured. He had followed the course of the Artisans' Institute from its commencement, and they were now about to form an important part of the most important institution which had yet been founded in this country for the promotion of technical education. They might hope that in a few years England would no longer be behind France, Germany, and even Switzerland in the matter of instructing the great body of the working people in the arts. As a candid friend, he would say that they must avoid taking too narrow and material a view of science and art.

Mr. Harland, teacher of building construction and geometry, next addressed the meeting, remarking that about 60,000 houses were annually added to London, and that on an authoritative computation it had been shown that not more than 10,000 of this number were constructed in a manner to render them quite fit for habitation. It was the object of the class which he taught to do away with bad construction and bad building, and he might add that it was his intention to devote considerable time to the study of ironwork and sanitary engineering,—two subjects which had attracted much attention during the last two years.

Mr. E. C. Robins, member of the City Guilds Institute, felt interested in the Artisans' Institute, because it seemed to him that it was working out a problem which was being watched with close attention on all sides. Some of them had a misgiving as to the extent to which they might go in the direction of practical working in the class-room. But his passage through the rooms of the Institute had convinced him that there was something which might be done in the class-room without infringement upon what was done in the shop. In his opinion there was nothing like making a model of an object if it could be done, because with the assistance of their fingers they could be made to feel an interest in the particular work which could not be kept up without such manipulation. He sympathised very much with the want of proper teaching in the workshop. It arose from the fact that the old master of every trade had become an extinct person to a certain extent. Contracts used to be given to workmen separately, but now they had a great contractor who was responsible for everything, and who took the shortest cut to realise a safe position. If they wanted to enjoy the advantages of technical education, they must produce sympathy between the master and workman. But that sympathy would never come whilst they combined to take as much as they could and give as little as possible in return. He was afraid it was a fact that there was a feeling of that kind, and it could be overcome only by some means by which they should all be participators. How that was to come about they would doubtless learn from the forthcoming lectures of Mr. Sedley Taylor, and others, at the rooms of the Society af Arts.

Mr. Channon, teacher of the bricklayers' class, believed that a few years ago architects found great difficulty in getting ornamental designs in brickwork properly executed, and that this was one of the main reasons for the establishment of his class at the Institute. To show what progress had been made in this branch of the arts he cited the buildings in Cadogan-square, the Chelsea Embankment, and Westwood House, West Hill, Sydenham, which latter he thought was one of the best pieces of brickwork produced.

Professor Huntington, of King's College, said that progress was the result of the application of scientific principles rather than of chance discovery; and the tendency of science was in all cases to cheapen production. It behoved them to bear in mind the fact that that nation which gave the greatest attention to the application of scientific principles would by so much stand the greatest chance of success. He would add that they should all recollect that they were students just as much when they became men as when they were so-called students.

The Chairman read the following list of the students entered:—

Solid Geometry	22
Model and Freehand	15
Plane Geometry	6
Modelling	9
Estimating, Quantities, and Mensuration Classes.	20
Building Construction	12
Bricklayers	15
Carpenters	18
Masons	9
Tin-plate Pattern Class	30
Writing and Arithmetic	5
Metal-Turning Class	7
Total	168

The next business was the distribution of prizes to various students, the following being the successful competitors:—J. J. Rawlins (solid geometry), T. Jennings (ditto), W. Reading (model drawing), A. Young (freehand drawing), T. W. Gord (ditto), W. Clifford (modelling), J. Smith (ditto), W. Mead (solid geometry), J. Tryell (ditto), A. B. Mathews (ditto), A. Cleverly (ditto), W. R. Rawlins (ditto), W. Smith (ditto).

Mr. Hodgson Pratt moved a vote of thanks to the Chairman for presiding. He was quite sure that what he, and those who followed him, had said, would show them that the experiment carried on by the Institute was one of interest to their common country. He knew no class in the community so thoroughly alive to the welfare of their country as the working classes. As a rule, they had always shown a true spirit of citizenship, and he believed that that feeling would be enhanced by the thought that the work which was done in the Institute was a truly national work. He desired to acknowledge the great zeal and energy which had been shown by Mr. Millis, the secretary of the Institute. That gentleman was an example of what all the teachers had shown in their several degrees,—namely, an untiring devotion to the work of the Institute, for which, he was sorry to say, they had received but small remuneration. That was no trifling matter when they remembered that those teachers were all working men who devoted their leisure to the great objects for which the Institute was founded.

The motion having been seconded and adopted,

The Chairman thanked the meeting, and a lighter entertainment was then proceeded with.

LEICESTER AND LEICESTERSHIRE SOCIETY OF ARCHITECTS.

THE eighth annual meeting of the Society was held at Mr. Clarke's Library, on the 14th of January, Mr. Joseph Goddard in the chair. A ballot was taken for the election of president for the year 1881, and Mr. Joseph Goddard was unanimously re-elected.

The secretary read the annual report of the Council, which was received and adopted, and ordered to be printed and circulated in the usual way. The book prizes were presented to the successful competitors, Arthur Wakerley, J. H. Carte, and Walter A. Catlow.

A ballot was then taken for the election of honorary secretary, and Mr. Jackson was unanimously re-elected.

A ballot was also taken for the election of the Council, and Messrs. Shenton, Millican, Goodacre, and Everard were re-elected.

Works of Decorative Art, 1881.—We understand it is intended to hold, during the ensuing season, an exhibition of select works of decorative art in extensive galleries, now in course of construction, in the rear of 103A, New Bond-street.

A TOAST TO THE PRESS.

AT a banquet given recently by the "Société des Beaux Arts," at Nice, to the local authorities and friends of the arts generally, the toast to the press was "carried," as they say in French, by our old friend and colleague, M. César Daly, who, with his accustomed fluency and *esprit*, and an intonation and manner peculiarly his own, seems to have charmed all present. It was a happy thought which led him to prove that journalists had once been plastic artists. To-day, he said, though in fuller and more eloquent language than we have time or space to adopt, you use the pen, and with a drop of fluid educe light, emotion, and even will; in the time of the Greeks and Romans you often contented yourselves with the stylus, but have you no recollection of a still remoter time, when, in your earliest infancy, instead of using the twenty-four letters of the alphabet, you impressed upon a page of granite or of bronze representations of the objects you wished to refer to and made them symbols of the sentiments and ideas you desired to express? You wrote then with hieroglyphics, your handwriting consisted of pictures, full of charm and interest. You were, in short, *plasticiens*. We artists claim literature as another Sister, and our common mother is Poetry, who feeds eternally and from unnumbered sources Art in all its shapes. Proceeding in this strain he roused enthusiasm, and it would not have surprised us if his brother artists had on the spot acclaimed him *César Imperator!*

LECTURES AT THE PARKES MUSEUM OF HYGIENE.

WATER SUPPLY AND FILTRATION.

THE third* of the course of lectures to members of building societies and others on "Dwelling Houses" was given on the 22nd ult. by Prof. Corfield, who took for his subject "Water Supply and Filtration." He observed that the quantity of water required per head of the population was from 30 to 35 gallons per day. Of that quantity, about 20 or 25 gallons per head were required for domestic purposes, including baths, the remaining 10 gallons being required for washing and watering the streets, flushing the sewers, and for manufacturing purposes. The great source from which water could be got was rain, which was, indeed, the indirect source of all water supply, so that it became very important to measure the rain-fall. Rain-water collected under proper conditions as it fell in the country was a very pure drinking-water, but when collected in towns, or near large towns, it was invariably unfit to drink, as it contained filth in the shape of soot and organic matter. Of well-water, that afforded by shallow wells was very dangerous and unreliable for drinking purposes, because shallow wells received more or less of the surface drainage of the vicinity. To mitigate this evil to some extent Mr. Tudor, the surveyor to the Goole Sanitary Authority, had devised a water-tight lining, consisting of a stoneware cylinder, for wells. It was a well-established fact that upon pervious strata, such as sand or gravel, where shallow wells abounded, typhoid fever and kindred diseases were enormously more prevalent than upon impervious strata such as clay or rock. Springs and streams afforded a great variety of water as to quality, but most of those springs whose water was of an ordinary temperature, and not too much impregnated with mineral matter, afforded good potable water. The waters of springs were generally very hard, though very pure, because they were not contaminated by organic matter. It was from springs that the Romans obtained their water and conveyed it by means of aqueducts to their cities. Fortunately for them they did not know how to pump water from the yellow Tiber,—a fouler river than the Thames as it flowed through London. They therefore went to Tivoli, and to the springs in the Alban hills, and to streams and lakes. The aqueducts were simply channels for the conduct of the water, such channels being carried over the valleys on arches of greater or less altitude, and where the ground was high, carried on or under its surface by means of tunnelling. These aqueducts were several of them forty or fifty miles in length, and some of them carried two or even three channels, one above another. Altogether there were nine of these costly aqueducts to supply Rome with water, two of them being carried wholly underground to lessen the risk of the water supply of the city being cut off by invading barbarians. It had been alleged by some engineers that the Romans were unacquainted with the principle of the inverted syphon, for they had not used it in conveying water across valleys to their cities. They were acquainted with it, however, and it was practically applied in the aqueduct erected by the Emperor Claudius to supply Lugudunum (Lyons), his favourite residential city, with water. Some of the aqueducts constructed to supply Rome, when in the plenitude of its power, with water were still used for that purpose, and brought water from the same sources as of old. With regard to water, Rome was still one of the best-supplied cities in the world, and nothing was more startling to those who visited Rome for the first time than to see the enormous amount of pure water continually running from the numerous public fountains of the city. It had been calculated that the sectional area of the channels of the aqueducts supplying water to Rome in ancient times was 120 square feet. In other words, as Mr. Parker had very well put it, a stream of water 20 ft. wide and 6 ft. deep was constantly flowing into the city, which would give 330 gallons per day per head of the population. The lecturer next pointed out that some of our towns are supplied with water in a somewhat similar manner, though not on so liberal a scale, as Rome, *i.e.*, by means of water brought from mountain lakes and streams at a distance, and observed that as a general rule such supplies were far superior to those drawn from rivers, the water of which was generally so impure as to be unfit to drink. The method of constructing artesian wells having been briefly described, the lecturer observed that such wells furnished very good water, but it was very hard. Now, hard water could be softened on a small scale by boiling, by which operation the carbonic acid was driven off in the steam and the carbonate of lime was precipitated. On a large scale water could be softened by adding quicklime to it, as in Clark's process, the quicklime absorbing the free carbonic acid and thus causing the carbonate of lime to be precipitated. The process known as the Porter-Clark process was an improvement on Clark's process, and included means of filtration. More recently, Messrs. Atkins had introduced a method of softening water combined with rapid filtration, but it remained to be seen whether it could be continuously and efficiently employed on a very large scale. Discussing the merits of the constant *versus* the intermittent system of supply, the lecturer pronounced unhesitatingly in favour of a constant service, as by its adoption cisterns, butts, and other receptacles for the storage of the water were rendered unnecessary. Such receptacles speedily got foul unless they were periodically cleansed, and the foul and stagnant water they often contained was the source of a great deal of disease. It had been found, too, that at Croydon, outbreaks of disease had been traced to the fact of bad air from closets and drains having been drawn into the empty mains by suction. With regard to the prevention of waste, he believed that in several towns where the constant service was adopted the consumption of water was less per head than it had been under the intermittent system. Water-closets should never be supplied directly from the cistern which supplied the drinking-water, and the overflow pipe should never be carried into a drain or water-closet trap, but allowed to run out through the wall and to discharge into the open air when the ball-cock was out of order, as was now insisted upon by the water companies. In large numbers of houses at the present time the overflow waste-pipe was connected direct with the house drain, of which it frequently formed, indeed, the only ventilator, and when it was seen that such ventilator had its exit on a level with the top of the cistern the danger of the contamination of drinking-water by sewer-gas was obvious. In conclusion, the lecturer described the methods of purification adopted on a large scale in the shape of filter-beds (the construction of which he explained) by the water companies, and on a small scale in the shape of portable filters in households. Of domestic filters, he spoke of those which used a filtering medium of animal charcoal as very good, provided the material were well burned: if insufficiently burned it was likely to become charged with impurities and to harbour worms. Silicated carbon and spongy iron also afforded good filtering materials. But, whatever the filtering medium used, downward filtration was the best, inasmuch as it facilitated the aëration or oxygenation of the water, this process serving to destroy organic impurities.

At the conclusion of the lecture, a vote of thanks was moved and seconded by two working men, who said that these lectures would have the effect of inducing all who heard them to look into the details of their houses and see that their domestic appliances were properly fitted and in good order.

* The preceding lectures have been reported *in extenso* in the *Builder*.

HOUSE DRAINAGE.

The fourth lecture of the series was delivered on Saturday, the 5th inst., by Mr. Rogers Field, C.E., who took for his subject "House Drainage." He commenced by explaining the sanitary principles that should be observed in carrying out works of house-drainage. It was of the utmost importance that those principles should be thoroughly understood, as the true application of them would enable a sound opinion to be formed on what was good and what was bad drainage, and also on the value of the various sanitary appliances now put forward in such numbers. The essential principles of perfect drainage were very few and simple, in fact, they might be reduced to two:—(1) that all foul matter should be rapidly and completely removed from the house directly it was produced; (2) that there should be no back current of foul air into the house through the pipes and drains which were used for removing the foul matter. These principles were so simple and self-evident that there was great danger of their importance being overlooked, but a little careful consideration would show that they really went to the root of the whole question. Taking the first principle,—the immediate and complete removal of foul matter,—the lecturer pointed out that cesspools did not fulfil this condition. Although it was now generally admitted that they were radically wrong, he was sorry to say that there were many traps and other contrivances of the nature of cesspools, which were still largely used. The old-fashioned square dip-trap, or mason's trap, was one of these. This was still constantly fixed beneath the floors of sculleries as a fat trap, and was also advocated by many so-called "practical men" as the best form of trap for the interception of sewer-gas. The leaden D traps, still largely in vogue, were also, in effect, small cesspools, and should be rigidly excluded in good drainage; in fact, he would recommend that no man who valued his health and that of his family should take a house in which there were any pan-closets or **D** traps. He showed experiments illustrative of the defects of these apparatus, and then proceeded to point out that what was required was that the drains should be *self-cleansing*, to effect which they must be of a proper size (large pipes as a general rule were a mistake), have a proper fall, and be truly laid. He described the various methods of jointing pipes, and pointed out their relative advantages and the necessity of the drains being perfectly watertight. It was, he said, astonishing to find the ignorance that prevailed among builders on this point, in illustration of which he quoted a case which came under his notice only the day before. A builder being asked particulars of the drains of a recently-built house in the suburbs, stated that the drainage was in perfect order, and on being pressed for particulars as to how the drains were jointed, said "Oh, that was all right. As a practical man he knew that it was a mistake to use cement, as it caused obstruction in the pipe; clay was no use, and he had therefore had the pipes laid without any material in the joints at all, so that it was impossible for the workmen to make any mistake;" and surely enough on opening down to the drains they were found all to be laid with absolutely nothing in the joints! The lecturer showed by means of experiments on the simplest form of closet apparatus the absolute necessity there was to have a good flush. In the case of the so-called "tall hopper," with an ordinary waste-preventer, the paper was not washed out of the trap at all, whereas in a "hopper" of improved construction, with a good flush, everything was immediately cleared out. The lecturer then proceeded to explain the second principle of perfect drainage, viz.,—the prevention of back currents of foul air into the house. He explained the insufficiency of the ordinary unventilated water-trap, which was continually absorbing the foul air from the sewer and giving

it off on the other side, and that the only real security was in a proper system of disconnexion and ventilation, and he showed by means of several diagrams the difference between direct communication and disconnexion. He explained the various appliances for disconnecting house-drains from the sewer, including the ordinary disconnecting gully, Buchan's, Hellyer's, and Potts's disconnecting traps, and the disconnecting manhole. He also illustrated, by experiment with a glass tube, the necessity of having an inlet and an outlet in order to establish true ventilation. After alluding to the necessity of cutting off the overflow of cisterns and waste-pipes of safes from the drains, and of having separate cisterns for water-closets, &c., he concluded by pointing out the necessity of periodical attention being paid to the drains. People were aware that chimneys required sweeping and rooms cleaning, but they thought that drains might be left without ever being looked at from year's end to year's end. This was a great mistake. Good drainage, in which everything was accessible, reduced the amount of attention to a minimum, but would not altogether do away with the necessity of some attention.

A vote of thanks was moved by a working man, and seconded by "a sanitary inspector of a suburban district just outside London," where he said, many of the points insisted upon by Mr. Rogers Field were being generally applied. He only wished that "local nabobs" generally could be brought to hear such lectures, and to pay heed to their teachings in the districts under their control.

The last lecture of the course will be delivered on Saturday, the 19th inst., by Professor Corfield, subject: "Water-closets, Sinks, and Baths."

THE *LIVADIA*.

THE correspondent of a morning paper telegraphs from Berlin that a detachment of Russian sailors has gone to Ferrol to take part in the extensive repairs necessary for the *Livadia* after her first brief voyage. It will be remembered by our readers that, while the press in general was full of laudation of this last triumph of her naval architects (a laudation in which persons who have been regarded as high authorities in this country took part), we raised the voice of warning. To return to the earliest form of vessel,—that of the coracle, on an exaggerated scale, did not appear to us a happy conception. So much do the known laws of movement through water oppose the speed attainable by a vessel of disproportionate beam, that we felt it safer to rely on scientific forecast than on accounts of actual behaviour, which might prove to be too favourable. Now we find that it is contended by Russian ship-builders that, owing to the shock of the monster engines required for her propulsion, "the *Livadia* will never be a seaworthy vessel." We speak with all the reserve that should be maintained by those who have not had the advantage of a voyage in the *Livadia*. But it is the opinion of not a few professional men that the distinct propelling systems with which this craft is furnished act against, instead of in harmony with, one another, and actually tear the hull to pieces, as a pig cuts its own throat in swimming. This was the view put forward by our friends at a time when the public were told that some "floating wreck" had stove in some of the bow of the *Livadia*. It assumes more significance now that we are told of the large preparations that are being made to remedy so small a disaster. The *Livadia* has yet to prove that she is the ship of the future, or, for that matter, of the present. It is all the more satisfactory, from a scientific standpoint, to feel assured that all that could be done with excellent materials and workmanship to do justice to the design was supplied by the builders of the *Livadia*.

Quotations are being made, says the *Timber Trades Journal*, for Quebec yellow pine at 17*l.* 10s. for 1st, 11*l.* 10s. for 2nd, and 6*l.* for 3rd, per Petersburg standard, free on board. For spruce, St. John and Miramichi shipment, 4*l.* 10s. is, we believe, asked; while for Riga goods the figures are put down at 7*l.* for full 11 in. crown, although a little time back 7*l.* 5s. was asked, and for 3 × 9 and 3 × 10½ to 11, 6*l.* 10s. to 6*l.* 10s. to 6*l.* 15s. free on board.

HONOLULU CATHEDRAL, SANDWICH ISLANDS.

IT is now proposed by the Bishop to proceed with the building of this cathedral. It was commenced in 1867 from the designs of Messrs. Slater & Carpenter. Great interest was felt in it by the late king and afterwards by his widow, Queen Emma (who visited England). The foundations of the choir and tower were laid, and much of the stonework of the arcades of the choir and ambulatory windows was prepared and sent out from England—there being then no available freestone discovered in the islands, although there was plenty of volcanic reefstone available for walling. Unfortunately, however, circumstances prevented the erection of any but temporary buildings. Efforts are now being made to proceed with the suspended works, and the nave, and aisles and transepts, will probably be first erected, and the choir proceeded with as funds allow. The original design of the nave has been simplified to save the cost of freestone and labour on it, for skilled labour there commands five dollars per day. Freestone can be imported from California, and there has been found recently masses of hard sandstone torn up from the bed of the sea and cast on the shore which it is believed can be utilised, even at the high-priced labour, at a cheaper rate than stone worked and sent out from England. Drawings and specifications are being prepared by the architects, Mr. R. Herbert Carpenter and Mr. B. Ingelow.

OBITUARY.

WE regret to announce the death of Mr. John Clemence, builder, late of Villiers-street, Strand. The deceased in early life came from a village in Cornwall, and his first employment in London was in taking some of the carpenters' work to the houses in Regent-street and Regent Quadrant, then in course of erection. He soon afterwards commenced business in Villiers-street, Strand, as a builder, and by dint of perseverance and industry amassed a good fortune. He was well known in the trade as a man of uprightness and integrity, and was greatly respected by all with whom he had business connexions. His remains were interred at Abney Park Cemetery on Saturday last, and, in addition to the numerous relatives and friends who formed the funeral procession, about seventy of his *employés*, consisting of clerks, foremen, and the oldest workmen, formed the procession at the cemetery-gate, and followed him to the grave to mark their respect for his memory.

BOROUGH SURVEYORS.

SIR,—Perhaps no being under the sun is more harassed, and leads a more worried life, than a borough surveyor, for no man has to contribute more (directly or indirectly) to the comfort of the inhabitants than he has; and, therefore, if occasionally a road opposite some "local magnate's" habitation happens to be a trifle muddier than usual, he is subject to all the vials of that magnate's wrath. So, a loose flag or paving stone, a dusty day, a defective drain, a smoky chimney, or a thousand and one little ills, are the subjects of hourly visitations on the poor surveyor's devoted head.

No one need envy those who, when taking such offices under a corporation, place all their "eggs in one basket," because, as "little pots are soon hot," so any fussy, empty-headed nonentity, who "cavils on the ninth part of a hair," can, perhaps without any reasonable pretext, raise a cabal whereby the surveyor's position is rendered at once uncomfortable and untenable.

To a really enterprising, able man, who values his independence and honour, the position of a surveyor in most boroughs is scarcely worth having, and is one which no local practitioner of any standing at all would give up his private business for.

True, now and again a surveyorship of some importance is open for competition, but if such a *rara avis* as Manchester, Salford, Newcastle, or Bradford presents itself, it is generally secured by a gentleman occupying a similar position in a smaller town, and is used at the earliest opportunity as a stepping-stone to another and better position, or to what is often a more lucrative one,—namely, a private practice.

A vacancy arising in a large town frequently causes other vacancies in neighbouring towns, because almost invariably such a vacancy is filled by an applicant filling a borough surveyorship elsewhere, rendering it necessary for his post to be filled by another borough surveyor, who is graduating upwards, thus causing repeated changes throughout the country.

Not so in a borough where the surveyor is allowed to practise on his own account, as he gradually builds up a business, which enables him to settle permanently in the town, and at the same time be a stay to the corporation, who enjoy the benefit of his matured experience, often keeping the council clear of litigation, and serving the borough with a large, well-selected, steady, and able staff of clerks, at much less cost, and with greater efficiency and promptitude, than is often the case with a more inexperienced man and a limited staff.

Probably there are not fifteen boroughs in the country where the salary is more than 400*l.* a year, and the man filling a position of this kind is expected, not only to appear like a gentleman, but he must be, like Cæsar's wife, above suspicion, inaccessible to corruption, and incapable of accepting commissions or *douceurs* of any kind; and, as I am proud to believe, the great majority of borough surveyors are so, and have the interests of their employers and the ratepayers at heart with a singleness of purpose unsurpassed by men in any other walk of life. It necessarily follows to my mind that the position of a man, say with a large family to feed, clothe, and educate, on so limited an income, must be a very unenviable one in a financial point of view.

Far better, then, if he is a man of energy, if you would have him to manifest any independence at all, to allow him to practise privately, and thereby be able to withstand, and keep at bay, the multitude of tempters who are constantly at his elbow, ready to accomplish and glory in his fall.

Happily such occurrences seldom happen, and while, therefore, the fraternity must be looked upon by every one as honourable men, yet they are to be sympathised with in the daily struggle which must be their task to "make ends meet." "Poor and content is rich enough," but as the immortal Burns puts it,—

> "To catch Dame Fortune's golden smile,
> Assiduous wait upon her,
> And gather gear by every wile
> That's justified by honour.
> Not for to hide it in a hedge,
> Nor for a train attendant,
> But for the glorious privilege
> Of being independent."

COR UNUM, VIA UNA.

THE FROST AND BOILER EXPLOSIONS.

SIR,—In reply to Mr. John Smeaton's letter, and for the public benefit generally, please grant me a corner in your invaluable journal, by way of explanation why the Yankee or one-pipe system of hot water is dangerous, with all due respect to Mr. J. Smeaton.

In the first place, the air-pipe is generally taken up to the top of the cold water supply tank, and is often some 50 ft. in length. This pipe, being single, cannot be expected to keep hot, but; like all others, becomes, when exposed, frost-bound; we will say to-night it is so, and also the cold supply to the hot-water tank. The water now is cooled down to say 60°, and consequently very much diminished in bulk. What next. The morning finds its regular roaring fire. The water is quickly brought up to 212°, and away goes the boiler, tank, or pipes. What is to prevent it, considering that water expands and contracts as follows? For every 22½° in cooling from 212° to 32° the results are as follow:—

In cooling 22½°	from	212°	or to	189½	18 Parts.
,,	,,	189½	,,	167	16·2 ,,
,,	,,	167	,,	144½	13·8 ,,
,,	,,	144½	,,	122	11·5 ,,
,,	,,	122	,,	99½	9·3 ,,
,,	,,	99½	,,	77	7·1 ,,
,,	,,	77	,,	54½	3·9 ,,
,,	,,	54½	,,	32	0·2 ,,

Of course you will notice that the expansion occasioned by heating water 22½° nearest the boiling point is nearly five times as great as is produced by the heating it 22½° from about the natural medium temperature, so that the water has every chance to cause a rupture. Now, sir, this rupture is very often at the manhole in the boiler, or at the connectors at the back and out of sight. Of course, not always; but when it is so, and is not noticed, everything is taken for granted to be right, except they get no water. This goes on for days, the water boils away below the top of the boiler, steam at once generates, the tank becomes a steam-chest, and what follows is too well known to require any description. Well, then, if this be so, and the one-pipe system is the best, let there be some provision for filling this tank, which may be effected by having a tap in the top and a funnel to fix in this, or by having a glass gauge to see the water. Safety-valves are not to be depended upon, however delicately they may be constructed; even those having flat faces and dead weights, when used in connexion with hot water become treacherous. I think I know every valve of this kind, having for the last twenty years made them my particular study. Use a tube of mercury if you like, you will then have a liquid safety-valve; but even with this you cannot consider the tank safe, as they are made so thin that they will not stand the pressure when the extra heat is brought about by the steam. Copper tanks are fitted about Worcestershire and found to be too expensive. Take my advice, and use the open-tank system, as then you can see what is going on, and also be able to fill the same without trouble, to say nothing of the fact that they often keep the rest of the pipes warm; and, again, to say nothing about being able to draw next to all your hot water when required without the use of stop-cocks for regulating the same.

P. J. DAVIES, Engineer.

N.B.—It is not generally known that you can boil water in a boiler until it becomes highly explosive, which may account for some of the unforeseen accidents.

PERSIAN PLAN DRAWING.

SIR,—In the paper on Persian architecture read at the Institute on the 31st ult. there was one point not connected with the artistic features of Persian architecture, but which is worth attention as bearing on the question of geometric proportions in architectural design, which has been so much debated.

Professor Lewis described the use of paper ruled in squares for drawing plans on, and observed that this manner of drawing the plan led to a general squareness of outline and to "a certain rhythmical proportion" in the lengths and widths.

It has been suggested more than once in your own columns, I believe, as well as elsewhere, that many of the geometrical proportions found in measuring ancient structures, as in Egypt, may have resulted simply from the employment of so many units of the same measure in each direction, just as, in setting out the length of walls in feet, a man, if he has no detailed instructions to guide him, is likely to take round numbers in feet each way. Here is an independent confirmation of this view from another quarter. If the ruled paper had not been mentioned by Professor Lewis, no doubt some stickler for finding the theory of geometrical proportions in everything would have discovered proof that the Persians designed their houses on geometrical ratios. May not some such process as the ruled paper be the equally simple explanation of some of the geometrical mare's nests that architectural theorists have discovered?

H. H. STATHAM.

INTERNATIONAL EXHIBITION OF 1851.

SIR,—I am exceedingly pleased to find, from your remarks in last week's edition of your valued journal, that the Society of Arts have taken up the subject of a memorial of the Exhibition of 1851, about which I wrote you a few months since. I trust they will be more successful in obtaining the ear of the First Commissioner of Works than I have been. I asked my friend, Mr. Firth, to lay the matter before the Commissioner, which he did, and I was to receive a reply in due course. Up to this moment I have not received the response as promised.

I say now, as I said then, that I think it highly discreditable to the British nation that the present generation should be in ignorance as to the position occupied by the Exhibition of 1851: a conception of the genius of the late Prince Consort, and one which resulted in so much benefit to mankind, and to this country in particular.

I cannot understand what can be the objection to the erection of the memorial, now standing in the Horticultural Gardens, unknown to all but a few privileged ticket-holders in the neighbourhood.

Use your powerful influence towards the removal of what, as I remarked before, I consider a standing discredit to the nation. No other country in Europe would act in the manner ours does.

SAMUEL WORSSAM.

ON SIMPLICITY, COMMON SENSE, AND INTELLIGENT SUPERVISION IN SANITARY APPLIANCES.

SIR,—When a large charitable institution with a highly-educated staff has its soil-pipes frozen, and a waste outside the front forming a magnificent icicle like a glacier; when all my neighbours have their water supply, and, in some instances, their gas supply, cut off,—buying water at 1d. the bucket, cooking in the drawing-room, and going without fires in the kitchen from fear of boiler explosion,—and are now lamenting over the disastrous results of the thaw, it may be asked if there is not a want of common sense and intelligent supervision in not preventing these usual concomitants of a severe winter?

The house I live in was built some thirty years ago by a speculative builder, who was his own architect. Having purchased the lease, and afterwards the ground-rent, and made it freehold with a registered indefeasible title, I set to work to remedy the numerous deficiencies, sanitary and otherwise. [After diverting the overflow pipe of the cisterns from direct communication with the drains and soil-pipes, and ventilating the soil-pipes, I covered over the leads on which the top cistern is placed with a glass roof, making it into a small conservatory, which is warmed by a coil of hot-water pipes attached to a small boiler heated by two Bunsen burners at the back of the gas fire-place in the bath and dressing room, thus maintaining a temperature of at least 40°, with 20° of frost outside. The water has always been ready, without breaking the ice, for my usual matutinal cold bath; a hot bath, for those who prefer it, being easily insured by Ewart's Crown boiler. The hall is warmed by a gas stove, with a flue. When the air is too damp, it is dried, and scented with aromatics; when too dry, moistened with ozone distributor. Gas in the basement heats a boiler to warm the hot-water pipes in a large conservatory, which forms a warm jacket to the side of the house. I am curious to learn how the open and outside soil-pipes in a certain suburban estate of Queen Anne houses, with all "the modern improvements," have behaved under the late trial. I apprehend they have tithed too much with many-coloured dados, garish and meretricious so-called æsthetic decorations, and neglected the weightier matters of intelligent sanitary supervision.

"*Currente calamo*," permit me to inquire why lecturers and professors in their remarks on ventilation so completely ignore the plan first suggested in your columns (March, 1862)? Is it because it is "costless" and unpatented?

P. HINCKES BIRD.

RE JOINERS' GLUE.

IN answer to "A Reader" in a recent issue as to "what will keep joiners' glue from turning mouldy," he having failed to preserve it from mould by sundry acids,—presupposing that the glue is ordinarily good (and there is always in the market much inferior glue), let him wash or wipe clean with a damp cloth the squares or tablets of glue, put them to dry, and as soon as thoroughly dry chalk their surfaces over. After this operation I would recommend him to put his stock of glue in a very dry, or rather warm, place, say a cupboard or locker near to, or not far from, a fireplace. If the glue should develope much mouldiness, or any worth speaking of, after the above process, it may be concluded the glue is not of good manufacture. Tolerably good glue, if kept in a damp place, will, like many other substances comparatively pure (and even wholly pure), throw out a mould. Dampness gives a certain elasticity and toughness to glue without rendering it soft and pliable, so that even the thickest squares will not break under the blow of the hammer, but will have to be cut into pieces with a chisel. Brittle glue is preferred by builders' workmen, cabinet-makers, and other wood-workers; and of late years the best description of glue is made in thin squares, and is of a more light and transparent colour than the old manufactures and the cheaper kinds. How best to melt, make, and thin glue to the proper consistency for workmanship uses, is another matter on which something might usefully be written. Glue that is "perished" by water or "burnt" should not be used (though it is, hundreds of times). It would be taken as an insult if one ventured to question some joiners' or cabinet-makers' knowledge as to the proper way of making a good pot of glue for workshop uses; yet not a few of these could be usefully enlightened on the matter, as well as on the making and rubbing of a glue joint. As I recommended chalk for the rubbing over of the surfaces of the squares of glue, it occurs to me as I am finishing these lines to mention that chalk has been used for long years by workmen making glue joints, the surface of a joint being often rubbed with a lump of the material to accelerate the rubbing and the setting of the joint, and particularly in cases where the wood is rather green or damp than of a seasoned description.

Chalk is also used by some workmen when the joint they have made is an indifferent one, and when the glue is black or dirty, as its use will make the joint present a cleaner appearance when the glue is dry, and the joint levelled and cleaned off as finished work.

A WHILOM WORKMAN.

Society of Engineers.—The first ordinary meeting of the Society of Engineers for the present year was held on Monday, the 7th inst., in the Society's hall, Victoria-street, Westminster. The statement of accounts for 1880 was read, after which the president for 1880, Mr. Joseph Bernays, presented the premiums of books awarded for papers read during that year. The president for 1881, Mr. Charles Horsley, then delivered his inaugural address. The general position of the Society, he observed, was very satisfactory; a considerable number of members having been elected during the past year, and the accounts which had just been read showing a good balance in hand, and indicating generally a healthy condition of the Society's affairs.

REGISTERING DESIGNS.

SIR,—In the 1871 volume of the *Builder*, page 861, I note "Plan for Model Dwellings for the Industrial Classes," with note, "Registered 15th of March, 1871." These, with others, also registered, have since been published by the author. Will any reader inform me, through your columns, what the registration means and what protection it affords?

G. A. H.

LANDLORD AND TENANT.

RAWLINSON *v.* LOCK.

THIS was an action brought in the Clerkenwell County Court by Mr. Rawlinson, of Tufnell Park-road, against Mr. Eli Lock, of Kentish Town, to recover 10*l.*, the expenses incurred by the plaintiff in opening his drains. The plaintiff proved that he bought the house in 1878, and that, soon after, the drains began to smell, and had got so bad by the autumn of 1879 as to necessitate an examination of the closets, &c. Nothing was found; the smells still continued, and in March, 1880, the soil silted up in the garden drain, causing a most offensive smell.

The drain was opened, and about fifty or sixty buckets of soil taken out of the pipes; the rods were used and the drain was reported "clear," but a few months afterwards the soil came up into the house. In the month of June the drains were opened under the front parlour and about 100 buckets of soil taken out from the pipes; this time the rods showed that there was a stoppage further on. The drain was then opened on the footpath in front of the house from thence the stoppage was felt and broken, and turned out to be a plug of slate placed there by those in charge of the drainage works in the first instance. This plug prevented any connexion with the main sewer; thus, from June, 1878, the time of the plaintiff's occupancy, till June, 1880, a cesspool has been forming.

The defendant denied his liability, and stated he had superintended the making of the drains and that he had done all that was necessary.

The Judge held that a house was not completed fit for habitation till the drains were properly finished, and that the defendant had contracted to complete and finish the house and its appurtenances; he was properly liable. Verdict for the plaintiff, 10*l.* and costs—4*l.* 7*s.*

VARIORUM.

IN *Harper's Monthly Magazine* for the current month we still find the same remarkable amount of matter and illustrations, for the money charged, we have before alluded to. A tale, entitled "A Laodicean," commenced in the present volume, will attract the attention of our readers, as dealing with the doings of professors of architecture.——Lady Lindsay contributes to the new number of *Temple Bar* (Bentley) a capital little sketch of character, entitled "Poor Miss Brackenthorpe." It is true to nature in every line, and all the persons introduced in its few pages are limned as distinctly, and take their places in our memory as clearly, as if they had played their parts through the ordinary three volumes. The number is a good one generally.——We take a paragraph from the *Magazine of Art* for February, on "The Characteristics of Meissonier's Art":—"The Dutch manner was more purely and simply imitative of nature, the quality of the execution in the finest Dutch examples being so perfect that neither the paint nor the artist's handling of the paint makes itself sensible or apparent, whereas in M. Meissonier's work, although the dexterity is by no means obtrusive, there is no such effacement. His minuteness, then, is, or was, all his own. A lover of the 'infinitely little,' he is one of the most masculine of painters,—a painter, indeed, too masculine for sweetness of form or tenderness of manner. He is never weak; but then, also, he is never lofty, never trite, never pretty, never commonplace, never thoughtful, never pathetic. None of the modern seekers after poetry in art can have anything in common with him, for the mystical, the intense, and the subtle do not exist in his work; nor has he anything in common with the lover of sentiment. The general intelligent admiration of his painting is not likely to be ever lessened by anything difficult in the character or expression which he represents; in his characters he is full of energetic and powerful distinctness, and in his expressions he is insistent and broad. His subjects also are such as command the general interest; martial *tenue* and equipments, courtly little scenes of the last century, passages of recent military history,—these bits of commonplace, combined with character and costume, are such as succeed in pleasing at once the many and the few. The latter, who have no delight in lenses, and no special passion for the minute in painting, find a more educated pleasure in the breadth, the space, and the ease which he introduces into the tiniest frame."

Miscellanea.

The Late Mr. Elmore, R.A., and the Art-Union of London.—Bearing in mind the terms in which the operations of the Art-Union of London are sometimes referred to by persons who ought to know better, it is interesting to notice the extent to which the late distinguished painter and Academician, Mr. Elmore, was aided by the working of that Association throughout his career. One of his earliest exhibited pictures was bought by a prizeholder in 1843, "Peasantry of Naples," 40*l*. In 1844, "The Novice," 50*l*, and an "Italian Cornfield," 30*l*., were selected by prizeholders; in 1845 "The Origin of the Guelph and Ghibeline Quarrel," 262*l*. 10s.; in 1846, "The Fainting of Nero, 300*l*.; and in 1847, "The Invention of the Stocking Loom," which was afterwards engraved, 210*l*. Mr. Elmore had long desired that his painting "Marie Antoinette facing the Mob at the Tuileries," his best picture, as we believe, and now the property of Sir John Kelk, should be made known by a fine engraving, but no publisher would undertake it. Not very long before his death, however, the Council of the Art-Union purchased from him the copyright. A fine line engraving from it is in progress, impressions from which, when completed, will carry the name of the artist, through the organisation of the society, into every part of the world where the English language is spoken.

The Students Preliminary Examination of the Institution of Surveyors was held on the 25th and 26th ult. The passing of this examination is the condition of enrolment in the class of Students. The subjects comprised simple mathematics, the first three books of Euclid, history, one language (ancient or modern), and the writing of an original essay. Of the eleven candidates who entered, the following, whose names are given alphabetically, satisfied the examiners, viz.:—J. Crawter, A. P. Durlacher, A. Paull, R. C. Squarey, W. Tarrant, and C. E. Waring. W. Tarrant passed at the head of the list, obtaining nearly full marks in each subject. These candidates will be expected to present themselves for the final (technical) examination in April, 1883, at the close of their student course.

Lectures on Domestic Sanitation.—At the request of the Ladies' Sanitary Association, Dr. Richardson is about to deliver a course of lectures, having special reference to the requirements of women as sanitary household reformers. The lectures will be illustrated, wherever possible, by the oxy-hydrogen lantern. The first course will relate to food and digestion; the healthy circulation of the blood, and the means for keeping the organs of the circulation in the healthy state; respiration and ventilation. The first lecture of the course will be delivered on February the 12th, at 5·30 p.m., at the rooms of the Society of Arts, Adelphi, and will be continued on the same day of the week, and at the same hour, until the course of nine lectures is completed. Tickets, at a small charge, are to be obtained of the secretary, Miss Rose Adams, only, at the office of the Association, 22, Berners-street. Prizes and certificates will be given, and it is to be hoped that gentlemen as well as ladies will attend.

London International Medical and Sanitary Exhibition.—The regulations for this exhibition, which is to be held by the Parkes Museum of Hygiène, at South Kensington, from July 16th to August 13th this year, were finally decided upon at a meeting of the committee last Wednesday [Feb. 9th], and the full prospectus, with forms of application for space, will be ready for issue this week. The work of organisation will be carried on at the Parkes Museum, and for this purpose the library of the Museum will be open daily from ten to four, Saturdays ten to two.

Association of Municipal and Sanitary Engineers and Surveyors.—The Northern District Meeting is to be held at Blaydon-on-Tyne, on Friday, the 25th inst., when the following papers will be read and discussed:—"Roadways," &c., by James Hall, Borough Surveyor, Stockton; "Wood Pavements," by R. S. Rounthwaite, Borough Surveyor, Sunderland. During the day the works of Messrs. Smith, Patterson, & Co., Sanitary Iron-founders; Messrs. Douglas Brothers' Iron-works, Messrs. Harriman & Co.'s Pipe-works, and Blaydon Bottle-works, will be visited.

Insufficient Quantities.—In the case of Holloway *v.* Martin & Chamberlain, tried a few days ago before a special jury at the Staffordshire Assizes, the plaintiff was Mr. George Holloway, an auctioneer, residing at Kidderminster, and the defendants are architects practising in Birmingham. The statement of claim alleged that one Frederick Goodman contracted to erect certain schools for the Birmingham School Board; that before the completion of the contract he became a lunatic; that the plaintiff, with a view to complete the work, made inquiries of the defendants as to the amount payable to Goodman on the completion of the contract, and the defendants, with the intention of inducing him to complete the work, made false representations to him that a considerable sum of money would be due to Goodman, whereas, in fact, nothing would be due to him, thereby inducing Holloway to expend the sum of 1,545*l*. 3s. 2d., which he now claimed to recover. It was further alleged that defendants omitted to measure certain work, amounting to the value of 61*l*. 19s.; and that after the said Frederick Goodman became a lunatic the Birmingham School Board entered into a fresh contract with George O'Connor Holloway and with Francis Goodman to complete the erection of the Hutton-street Board School, and that Goodman afterwards assigned his share of the contract to Holloway, and that defendants improperly charged Holloway the sum of 183*l*. for taking out quantities for this work. The statement of defence alleged that in respect of 1,545*l*. they repeated the representation they made, and said that at the time they made it they believed it to be true, and that, if they were incorrect, they were not incorrect to their knowledge. With reference to the 61*l*. 19s., defendants said there was no debt between them and the plaintiff, and that all contract disputes were to be settled by them, and that the matter in question was such a dispute. They further said, with respect to the sum of 183*l*., that it was a charge properly due. The jury, on the ruling of Mr. Justice Watkin Williams as to points of law, gave a verdict for the defendants on all the items of the statement of claim.

The Manufactories of Agricultural Implements have doubled in the United States during the last ten years. In 1850 this industry gave employment to 5,361 hands. In 1880 it gives employment to 40,680. Ohio leads off, employing 10,248 people in this branch of manufacture; Illinois follows closely with 8,000; New York next, with 7,237; and then Pennsylvania, employing a few over 3,000. As the West, with its broad acres, demands ploughs, harrows, mowing-machines and harvesters, the men who manufacture them are moving that way. Twenty years ago all this class of manufacture was confined to New York and the New England States. Now, Illinois has more money invested in it than all the Eastern States to the Ohio line put together.—*Journal of Applied Science.*

English Machine-made Railway Watches. We learn from headquarters, says the *Watchmaker*, and have much pleasure in announcing, that the English Watch Company of Birmingham have this year secured the contract for watches for the Indian State Railways, which was last year taken by the American competitors of our home trade. We have in this journal at various times noticed the progress made by the English Watch Company, and their energy and perseverance in carrying out to a perfect end the system of machine watch-making in this country, and, considering that they were the first in England to venture the making of watches on the interchangeable system by machinery, there appears a singular fitness that Government work should be entrusted to them.

New Coroner's Court for Southwark.—At the last ordinary meeting of the Vestry of St. George's, Southwark, a letter was read from Mr. W. J. Payne, coroner for the City and Southwark, in reply to a communication from the Vestry, stating that he was strongly in favour of the establishment of a coroner's court for the borough in close proximity to the new mortuary, and it was unanimously agreed that the Vestry should convert premises in New-court, Borough, into "A Court," in accordance with the plans of Mr. Hiscocks, C.E., the surveyor; and also that all other necessary arrangements should be made for the convenience of the coroner, juries, and public.

A Serious Conflagration took place at the Victoria Docks last Tuesday. Several sheds were gutted, some railway trucks burned, and two vessels considerably injured.

TENDERS

For the City Guilds' Technical College, Tabernacle-row. Mr. Edward Clifton, architect:—

Bangs & Co.	£24,643 0 0
Higgs & Hill	23,745 0 0
Smith & Co.	23,470 0 0
Macey & Sons	23,220 0 0
Manley	22,977 0 0
Clarke & Bracey	22,773 0 0
Ashby & Horner	22,700 0 0
Holland & Hannen	22,547 0 0
Ansell	22,422 0 0
Adamson & Sons	22,392 0 0
Shaw	22,230 0 0
Grover	21,734 0 0
Conder	21,679 0 0
Nightingale	21,581 0 0
Perry & Co.	21,438 0 0
Lawrance	21,265 0 0
Brass	20,873 0 0
Peto Bros.	20,382 0 0

For new library, museum, students' rooms, nurses and servants' apartments, laundry, colonnade, and covered ways to connect with the main building at the Royal Berkshire Hospital, Reading. Messrs. Morris & Stallwood, architects:—

Rider & Son	£10,681 0 0
Brass	10,060 0 0
Woodroffe & Son	10,032 0 0
Silver & Sons	9,945 0 0
Filewood	9,797 0 0
Claridge	9,755 0 0
Lovatt	9,731 0 0
Shaw	9,721 0 0
Shepperd	9,619 0 0
Searle	9,569 10 0
Clarke & Bracey	9,544 0 0
Kimberley	9,495 0 0
Braid & Co.	9,470 0 0
Chappell	9,255 0 0
Clements	9,180 10 4
Simonds	8,891 0 0
Parnell & Son	8,719 0 0

For removal of mud, forming mooring-place and erecting house at Pilots Pill, for the Newport Harbour Commissioners. Mr. E. A. Lansdowne, architect:—

Firbank, Newport	£519 13 9
Jones & Son, Newport	464 0 0
Thomas, Newport	441 0 0
Linton, Newport	421 0 9

For alterations at No. 2, Kennington Park-road, for Mr. Fowler. Mr. Muggeridge, architect:—

Riddler	£525 0 0
Fisher	407 0 0
Burman	407 0 0

For the Corporation Sewage Farm for the Kidderminster Town Council. Mr. E. Pritchard, engineer. Quantities by Mr. E. J. Purnell:—

		Alternative Tender.
Kellett & Bentley, Ealing	£6,500 0 0	£5,969 0 0
Davison, Sheldon	5,797 0 0	5,3 3 0 0
Hughes, Lower Gornall	5,550 0 0	5,243 9 0
Currall & Lewis, Birm.	5,235 0 0	4,560 0 0
Mackay, Swansea	4,710 0 0	4,2?7 0 0
Kirk, Chester	4,320 0 0	3,990 0 0
Burkett & Co., Birm.	4,198 0 0	3,997 0 0
Vale, Kidderminster	3,680 0 0	3,100 0 0
Smith, London	3,078 0 0	3,012 0 0
Law, Kidderminster*	2,800 0 0	2,550 0 0

* Accepted.

For the erection of warehouse, Edmunds'-place, E.C. Mr. W. G. Vickery, architect:—

Greenwood	£4,743 0 0
Ashley Bros.	4,483 0 0
Brass	4,473 0 0
Nightingale	4,470 0 0
Conder	4,380 0 0
Crabb	4,209 0 0
Lawrance	4,156 0 0

For roads and sewers for the Harrow Station Estate, for Mr. H. Davis:—

Jackson	£1,195 0 0
Simmonds	1,120 0 0
Pound & Capper	1,059 0 0
Blake	1,042 0 0
Woodham	1,006 0 0
Alvech	788 0 0
Ford	629 0 0

For rebuilding Nos. 220 and 222, Mile End-road, for Mr. D. Salmon. Mr. Ellis Marsland, architect:—

J. Marsland, Walworth (accepted)	£980 0 0

For alterations and additions to the "Clarendon Arms," Hammersmith, for Messrs. Fuller, Smith, & Turner. Mr. W. Nunn, architect:—

Hunt	£1,339 10 0
Chamberlain	1,315 0 0
Wescombe	1,295 0 0
Nye	1,235 0 0
Lamble (accepted)	1,219 0 0

For finishing and fitting up the new library, museum, and students' rooms (Contract G) at the Royal Berkshire Hospital, Reading. Messrs. Morris & Stallwood, architects:—

Clarke & Bracey	£1,988 0 0
Clements	1,931 13 6
Searle	1,895 10 0
Silver & Sons	1,746 0 0
Sheppard	1,700 0 0
Filewood	1,673 0 0
Parnell & Son	1,612 0 0
Braid & Co.	1,600 0 0
Simonds	1,546 0 0
Shaw	1,539 0 0
Lovatt	1,338 0 0
Woodroffe & Son	1,300 0 0
Claridge	1,200 0 0
Kimberley	1,150 0 0

For additions and alterations to the Poor-law offices for the Guardians of the poor, at Stoke-upon-Trent. Mr. W. A. Keates, architect:—

Rutty & Warner, Stafford	£398	0	0
Minks, Fenton	365	0	0
Ellis, Hanley	341	10	0
Redfern, Hanley	328	0	0
Bradbury, Stoke	325	7	0
Ward, Hanley	320	0	0
Yoxall, Bros., Stoke (accepted)	265	0	0
Hancock, Stoke	262	0	0
Meadon & Son, Newcastle	260	0	0

For painting, &c., to the Poor-law offices for the Guardians of the poor, Stoke-upon-Trent. Mr. W. A. Keates, architect:—

Sprosson, Stoke	£220	10	0
Cochrane, Stafford	172	0	0
Bradbury, Stoke	165	0	0
Pemberton, Stoke	160	0	0
Spencer, Bradford	140	0	0
Peake, Bros., Stoke	130	0	0
Gee, Stoke	125	0	0
Macarthy, London	112	0	0
Morton, Stoke (accepted)	108	0	0

For the execution of road and sewer works at Barking, for the United Land Company, Limited:—

Porter	£3,650	0	0
McKenzie & Co.	2,792	0	0
Jesse Jackson	2,777	0	0
Pizzey	2,774	0	0
Iles	2,763	0	0
Harris	2,740	0	0
Dyer	2,644	0	0
Holloway	2,573	10	0
John Jackson	2,530	0	0
Catley	2,500	0	0
Joseph Jackson	2,492	7	6
Ford & Co.	2,395	0	0
Acock (accepted)	2,348	0	0
Wilkes & Co.*	3,769	0	0
Coker*	3,004	0	0

* Tenders received too late.

For the erection of schools at the Wesleyan Church Lewisham. Mr. Charles Bell, architect:—

Tarrant	£975	0	0
Mayer	922	0	0
Hughes	910	0	0
Kennard (accepted)	844	0	0

For the erection of Wesleyan Methodist Chapel, South Parade, Great Grimsby. Mr. Charles Bell, architect:—

Benton	£2,889	0	0
Willows & Roebuck	2,860	0	0
Saunders	2,879	0	0
Doughty	2,794	0	0
Guy	2,680	0	0
Loughton	2,665	0	0
Burnett	2,556	0	0
Perkess	2,500	0	0
Chapman	2,416	0	0
Topham	2,315	0	0
Riggall & Hewins (accepted)	2,303	0	0

For the erection of chapel and hall at the Orphan Working School, Maitland Park, Haverstock Hill, the gift of Sir James Tyler. Mr. Charles Bell, architect. Quantities by Mr. Henry Lovegrove:—

Patman & Fotheringham	£4,175	0	0
Outhwaite & Son	3,285	0	0
Coles	3,100	0	0
Tarrant & Son	3,057	0	0
White	2,987	0	0
Woodward	2,950	0	0
Green	2,800	0	0
Boden	2,787	0	0
Holliday	2,678	0	0

For the erection of master's house at the Orphan Working School, Maitland Park, Haverstock Hill, Mr. Charles Bell, architect. Quantities by Mr. H. Lovegrove:—

Coles	£1116	0	0
Patman & Co.	1100	0	0
White	1,078	0	0
Tarrant	1,082	0	0
Outhwaite	1,000	0	0
Green	998	0	0
Boden	995	0	0
Holliday	975	0	0

For the erection of stabling at Chiselhurst, for Mr. R. W. Perks. Mr. Charles Bell, architect:—

Lowe (accepted)	£500	0	0

For pulling down and rebuilding the Hope public-house, Lewisham, and two adjoining dwelling-houses and shops. Mr. T. Searancke Archer, architect:—

Syme & Duncan	£4,306	0	0
Freight	3,883	10	0
Jerrard	3,793	0	0
Priestly	3,409	0	0
Macey	3,343	0	0
Crisp & Tomlin	2,763	0	0
Beale (error,—withdrawn)	2,330	0	0

For the erection of a tavern at Great Yarmouth, for Mr. D. S. Bayfield. Messrs. Bottle & Olley, architects. Quantities supplied:—

Howes	£3,025	0	0
Beech & Cork	2,795	0	0
Edward Howes	2,780	0	0
Leggett (accepted)	2,751	0	0

For reparation, &c., at Nos. 11 and 13, Glasshouse-street, Westminster, for Mr. H. B. Bell. Mr. M. J. Lansdell, architect:—

Nuttall	£199	0	0
Brede	196	0	0
Bamford	195	0	0
Durrant	193	0	0
Adams	165	0	0

For dwelling-houses, stores, &c., on the Priory Estate, Dover, for Messrs. Gardner & Co., Brewers, Ash-by-Sandwich. Mr. E. W. Fry, architects:—

Lewis, Dover	£2,805	0	0
Petts & Son, Folkestone	2,744	0	0
W. & T. Denne, Walmer	2,714	0	0
Wills & Co., Dover	2,683	0	0
Paramore & Son, Margate	2,650	0	0
Dowle, Dover	2,516	0	0
Stiff, Dover	2,487	0	0
Adcock, Dover	2,465	0	0
G. H. Denne, Deal (accepted)	2,420	0	0
Matthews, Dover	2,389	0	0
Bromley, Dover	2,290	0	0

For additional accommodation for nurses and porters at Small Pox Hospital, Fulham, for the Managers of the London Asylum District:—
Sawyer (accepted).

For lodge, entrance gates, and boundary walls, at the Deptford Small Pox Hospital, Old Kent-road, for the Managers of the London Asylum District:—
Sawyer (accepted).

For alteration and repairs to the bar, Thistle and Crown, St. Martin's-lane, for Mr. J. Selman. Mr. S. Sanders, architect:—

Smith	£130	0	0
Jackson & Todd	115	0	0
Hoskins (accepted)	114	0	0
List	110	0	0

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S. B. L.—R. I. L.—W. H. B.—J. D.—B. C. B.—E. M.—J. J.—G. S.—G. V.—W. B. P.—D. B.—S. W.—C. J.—Lady G.—Y. & R.—M. & S.—S. G. H.—J. & W.—S. S.—B. & O.—H. L.—J. C. S.—J. E. S.—H. A. G.—W. H. E.—F. R.—R. A.—S. W.—H. W.—E. R.—R. A. L.—W. S. E.—R. B. F.—Captain E.—R. H. R.—M. W.—A. A. (the subject has been often treated of in our pages; we are not able to advise individually).—J. W. (please send particulars).—A. S. C. (next week).—Bursting of Boilers (next week).—Vex (the number of hours worked in the trades mentioned varies from 50 to 60 per week. Piecework prevails, we believe, in the majority of cabinet-makers' shops).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

Best Bath Stone.
WESTWOOD GROUND,
Box Ground, Combe Down,
Corsham Down,
And Farleigh Down.
RANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts.—[Advt.]

Doulting Freestone and Ham Hill Stone of best quality.
Prices, delivered at any part of the United Kingdom, given on application to
CHARLES TRASK,
Norton-sub-Hamdon, Ilminster, Somerset. [Advt.

Bath Stone.
SUMMER DRIED,
STOKE GROUND, and
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Supplied in any quantities on the shortest notice.
PICTOR & SONS, Box, Wilts. [Advt.]

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Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.
Office:
No. 90, Cannon-street, E.C. [Advt.]

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. [Advt.]

J. Sessions & Sons, Docks, Gloucester, Manufacturers of ENAMELLED SLATE and MARBLE CHIMNEY-PIECES, URINALS, &c. WELSH ROOFING SLATES direct from Quarries to any Station in the Kingdom. Manufacturers of Joinery & Mouldings. [Advt.]

B. J. Hudson & Sons,
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Immense quantities of thoroughly-seasoned Woods, specially adapted for Cabinet and Joinery purposes. Also Veneers of every description always in stock, at lowest possible prices.
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Manufacturers of
CHARLES COLLINGE'S PATENT
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LEVER, SCREW, & BARREL BOLTS,
Self-Acting "FALL DOWN" GATE STOPS,
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Roofing Felts.—F. Braby & Co.
INODOROUS, SARKING, SHEATHING, AND HAIR FELTS, KEPT ALWAYS IN STOCK. MANUFACTURERS OF PERFORATED ZINC, PERFORATED COPPER, AND PERFORATED IRON, IN VARIOUS DESIGNS AND GAUGES.

Wrought Iron Tanks.—F. Braby & Co.
PAINTED AND GALVANISED, OF IMPROVED MANUFACTURE.

Corrugated Iron.—F. Braby & Co.
GALVANISED AND BLACK IN ALL GAUGES KEPT IN STOCK. ZINC WORK OF ALL KINDS.

FITZROY WORKS, 356 to 360, EUSTON ROAD, LONDON.
Hatton Garden, Liverpool: Great Clyde Street, Glasgow; and at Cyprus.